NISTIR 7207-B

Software Write Block

Testing Support Tools Validation

Test and Code Review Report

March 2005

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U.S. Department of Commerce

Abstract

This NIST Internal Report consists of two parts. Part A covers the planning, design, and specification of testing and reviewing the Software write block (SWB) support tools. Part B, which is a companion document, covers the test and code review support report.

Part A gives a test plan, test design specification, and test case specification for validation of the disk drive software write block testing support tools. The test plan defines the scope, including specific items and features to be validated, the methodology or approach for validating the SWB test support tools, and some technical background. The test design specification gives requirements for validating SWB tools. These requirements yield assertions. Each assertion leads to one or more code reviews or test cases consisting of preconditions, values, and method(s) for gaining confidence that the SWB test support tools correctly assess those assertions, a test procedure and the expected results. The test case specification gives details of test and review procedures for setting up the test, performing the test, and assessing the results. Appendices include a code review checklist and source code for validation programs.

Part B reports the results of reviewing the source code of the SWB test tools and testing them against Part A of the companion NIST Internal Report entitled Software Write Block Testing Support Tools validation – Test Plan, Test Design Specification, and Test Case Specification.

Kaywords: Code review; computer forensic tool; software testing; software write block; testing support tools.

Acknowledgement

The following peopled participated in the code reviews in addition to the author: James R. Lyle (JRL), Steve Mead (SM), and Kelsey Rider (KR).

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Introduction[†]

There is a critical need in the law enforcement community to ensure the reliability of computer forensics tools. The Computer Forensics Tool Testing (CFTT) program is a joint project of the National Institute of Justice (NIJ), the research and development organization of the U.S. Department of Justice; the U.S. National Institute of Standards and Technology (NIST) Office of Law Enforcement Standards (OLES) and Information Technology Laboratory (ITL); and is supported by other organizations, including the Federal Bureau of Investigation, the Department of Defense Cyber Crime Center, and the Department of Homeland Security's Bureau of Immigration and Customs Enforcement and U.S. Secret Service. The goal of the CFTT project is to establish a methodology for testing computer forensics tools.

Code reviews and test results provide data to validate the test tools for disk drive *software write block* (SWB) testing given in *Software Write Block Tool Specification & Test Plan Version 3.0* (see http://www.cftt.nist.gov/). In other words, these provide data to gain confidence that when used according to the test plan, the SWB test tools meet their sepcifications.

This document reports the results of reviewing the source code of the SWB test tools and testing them against *Software Write Block Testing Tools Validation: Test Plan and Test Specification*. The items to be reviewed and tested with their top-level requirements are:

1. Tally13
   - In active mode, all interrupt 0x13 commands are intercepted and counted.
   - In passive mode, all commands are passed.

2. Test-hdl
   - Issue interrupt 0x13 commands.
   - Report counts from tally13.

3. T-off
   - Switch tally13 to passive mode.

4. Sig-log
   - Log whether the operator observes an audio or visual signal.

[†] Certain trade names and company products are mentioned in the text or identified. In no case does such identification imply recommendation or endorsement by the National Institute of Standards and Technology, nor does it imply that the products are necessarily the best available for the purpose.

Review and Test Results for SWB Test Tools

Items reviewed:

tally13.asm version 1.1 created 07/29/03
size: 6700 bytes
SHA1[1]: 54f5b7bcfb8181a50dce641e1167ffb0d50ca1bb

test-hdl.cpp version 1.1 created 08/23/03
size: 10 961 bytes
SHA1: 5680c926b61cbf8a8cb83382357b4162432af1e6

wb-defs.h version 1.2 created 08/31/03
size: 3422 bytes
SHA1: 14de4dca00bd06d39e0a50cb37c457a5913da894

t-off.cpp version 1.1 created 08/02/03
size: 3503 bytes
SHA1: cd9a9567410045bf4855b0b038745e7c1f9d59cc

sig-log.cpp version 1.1 created 10/30/03
size: 2993 bytes
SHA1: b5e4ea46d77ab0d7321e9c1d350f6d332761ea1f

Items tested:

tally13 version 1.1 compiled 07/29/03
executable:tally13.com
size: 3032 bytes
SHA1: e0f78fe3fbfcbd667243ea78c6b303757fbba90e

test-hdl version 1.1 compiled Aug 31 2003
which uses wb-defs.h version 1.2
executable: test-hdl.exe
size: 62 423 bytes
SHA1: e42f70f4e755a91a62f9b2afb0ef4d648b666dc8

t-off version 1.1 compiled Aug 2 2003
executable: t-off.exe
size: 55 000bytes
SHA1: e67df6affab99fecc3b3577708038e058824108f

sig-log version 1.1 compiled Oct 30 2003
executable: sig-log.exe
size: 59 369 bytes
SHA1: cd1a7d4516f10772330b96bc84c2698ee2e1c388

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[1] The Secure Hash Algorithm (SHA1), developed by NIST, along with the NSA, for use with the Digital Signature Standard (DSS) is specified within the Secure Hash Standard (SHS) [National Institute of Standards and Technology (NIST). FIPS Publication 180: Secure Hash Standard (SHS). May 1993.].

1 Code Review & Test Result Summary by Requirement

All programs write identifying and execution information.
Code reviews found that programs write identifying and execution information. All test cases run support this.

1.1 Tally13

In active mode tally13 blocks and counts all interrupt 0x13 commands.
Code review found that while in active mode, tally13 blocks and counts all commands. All test cases run support this.

In passive mode commands are passed.
Code review found that while in passive mode, tally13 passes all commands. All test cases run support this.

1.2 Test-hdl

Issue specified interrupt 0x13 commands to each disk drive and log results.
Code review found that test-hdl issues specified commands to each disk drive and, with reasonable behavior of tool under test, logs result. All test cases run support this.

Summarize commands sent and commands blocked.
Code review found that with reasonable behavior of tool under test, test-hdl summarizes commands sent and blocked. All test cases run support this.

1.3 T-off

Command tally13 to passive mode.
Code review found that t-off commands tally13 to passive mode. All test cases run support this.

1.4 Sig-log

Query the operator if a signal was observed, and log the operator's response.
Code review found that sig-log queries the operator and logs the response. All test cases run support this.

2 Anomalies

Code review found that tally13 might have memory overwrites if used with more than five disk drives. This relates to STV-RM-06 "Tally13 allows how many of each interrupt 0x13 command is received in active mode for each disk drive to be retrieved."

Case: T13-01.

If an SWB tool handles interrupt 0x13 commands in extremely unorthodox ways, such as receiving one command and relaying a different command, test-hdl might not accurately characterize the behavior in terms of blocking or allowing commands. This relates to STV-RM-14 “Test-hdl logs how many of each command is sent and how many of each command is blocked for each disk drive.”, STV-RM-15 “Test-hdl logs that all, not all or no commands were blocked for each disk drive.”, and STV-RM-16 “Test-hdl logs if any commands were received, but not sent.”

The program test-hdl could be a little more precise if it checked the count for a command immediately before and after each command is sent, rather than checking all counts only before and after all commands.

Cases: THDL-01 and THDL-05.

3 Observation

One insignificant part of STV-AM-14 is not satisfied. If any command counts are not zero at the beginning of a test, the test results should be discarded. When test-hdl starts, it reports this condition, if it exists, but it does not log *which* command is not zero, as required. Since this lack of detail has no impact on testing SWB tools, the phrase “command and” should be removed from the assertion and from the source requirement STV-RM-11. Also, the assertion and requirement should be clearer about the time this applies. An improved version is “If the number of each command received for each disk drive is not zero *when test-hdl starts,* test-hdl logs the ~~command and~~ disk drive.”

Cases: THDL-01 and THDL-03.

The test name and machine name, called for in STV-AM-10, STV-AM-21, and STV-AM-25, and external drive labels, called for in STV-AM-11, are just copied from the command line. There is no way to check within a test case if the information is correct. Some “sanity checks” may be done between cases and also when this report is reviewed, but this data has little primary information content. It is a convenient way to log test case information, though.

Cases: THDL-01, THDL-04, TOFF-01, TOFF-02, SIGL-01, and SIGL02.

The source code file name(s), called for in STV-AM-01, or the program name, called for in STV-AM-09, STV-AM-20, and STV-AM-24, are not explicitly and separately reported, although the names are easily inferred from other information reported.

Cases: T13-02, THDL-02, TOFF-02, and SIGL-02.

4 Code Review and Test Case Selection

All code reviews and test cases were applied.

5 Code Review and Test Results by Assertion

This section presents the test results by assertion. The assertions are taken from the *Software Write Block Testing Support Tools Validation: Test Plan, Test Design Specification, and Test Case Specification*, which is Part A, the companion NIST Internal Report.

5.1 Assertions for Mandatory Features

5.1.1 Tally13

STV-AM-01. When executed, tally13 writes the following information to stdout: program name, file names, version numbers and date and time of creation of each source file, system date and time program execution begins, and date and time compiled.

Code review passed. The program logged all the information, except explicitly and separately listing the source code file name, tally13.asm.

Cases: T13-01 and T13-02.

STV-AM-02. Tally13 shall start running in passive mode.

Code review passed. The dir c: command immediately after tally13 started running supports that tally13 started in passive mode.

Cases: T13-01 and T13-02.

STV-AM-03. Tally13 may be switched from passive to active mode.

Code review passed. A series of dir c: and vtact commands support that tally13 was in passive mode and was switched to active mode.

Cases: T13-01 and T13-02.

STV-AM-04. Tally13 may be switched from active to passive mode.

Code review passed. A series of dir c: and vtpass commands support that tally13 was in active mode and was switched to passive mode.

Cases: T13-01 and T13-02.

STV-AM-05. Tally13 stays in passive mode until switched.

Code review passed. A series of vtpass and dir c: commands support that tally13 stayed in active mode until switched.

Cases: T13-01 and T13-02.

STV-AM-06. Tally13 stays in active mode until switched.

Code review passed. A series of vtact and dir c: commands support that tally13 stayed in active mode until switched.

Cases: T13-01 and T13-02.

STV-AM-07. Tally13 allows how many of each interrupt 0x13 command is received in active mode for each disk drive to be retrieved.

Code review passed if tally13 is used with five or fewer disk drives. If tally13 is used with more than five disk drives, arrays may be accessed out of bounds. As the first step of T13-03, tally13 was started, a dir c: command was executed (showing tally13 is in passive mode), then vtreport showed that tally13 did not count any of the 0x13 commands from the dir command. Then vtact put tally13 in active mode. A series of vtcmdgrp commands sent groups of commands with certain bits on to certain drives. After each vtcmdgrp, vtreport showed the current counts. The log file highlights show the changes from the immediately preceding report.

Cases: T13-01 and T13-03.

STV-AM-08. An identifying value is returned via the query interface when tally13 is present.

Code review passed. When vtact was run, it reported the identifying value returned.

Cases: T13-01 and T13-02.

5.1.2 Test-hdl

STV-AM-09. When executed, test-hdl logs the following information: program name, file names, version numbers and date and time of creation of each source file, system date and time program execution begins, and date and time compiled.

Code review passed. The program logged all the information, except explicitly and separately listing the program name.

Cases: THDL-01 and THDL-02.

STV-AM-10. When executed, test-hdl logs the following information: command line, including any command line options, test case ID, command category to be tested, operator ID (initials or name), and name of the computer on which the program is executed.

Code review passed. The program logged all the information.

Cases: THDL-01 and THDL-04.

STV-AM-11. When executed, test-hdl writes the following information to a log file: the number of installed disk drives and the external labels of each disk drive.

Code review passed. The log file highlights of THDL-04 show that test-hdl logged the number of disk drives and their external labels.

Cases: THDL-01 and THDL-04.

STV-AM-12. If tally13 is not running, test-hdl issues a message and exits.

Code review passed. As the first step of THDL-02 test-hdl was run. It reported that tally13 was not running and exited.

Cases: THDL-01 and THDL-02.

STV-AM-13. Test-hdl commands tally13 to active mode.

Code review passed. As the first step of THDL-04 tally13 was run, then test-hdl was run. The result of the dir c: command supports that tally13 was in active mode.

Cases: THDL-01 and THDL-04.

STV-AM-14. If the number of each command received for each disk drive is not zero, test-hdl logs the command and disk drive.

Code review found that test-hdl does not log which command has a non-zero count. In THDL-03, tally13 was run, then vtact was run to put tally13 in active mode. A dir c: command sent commands, which tally13 counted. When test-hdl was run, it reported which drive had non-zero count, but did not specify which commands.

Note: A comment at line 58 in the code said test-hdl exits if the count were not zero. This crept into the criteria, even though it was not a requirement. The program test-hdl did not exit.

Cases: THDL-01 and THDL-03.

STV-AM-15. Test-hdl sends each interrupt 0x13 command in the specified category to each disk drive.

Code review passed. As the first step of THDL-04 and THDL-05 tally13 was run. In THDL-04 test-hdl sent all write commands. In THDL-05 vtblksom was run, to block commands by number not function, then test-hdl sent all commands, one category at a time. Finally, for both cases, vtreport was run to confirm that expected commands had been received by tally13.

Cases: THDL-01, THDL-04, and THDL-05.

STV-AM-16. For each command sent, test-hdl logs the command code, disk drive issued to, return count, status register value, and carry flag setting.

Code review passed. As the first step of THDL-04 and THDL-05 tally13 was run. In THDL-05 vtblksom was run. In both cases test-hdl was run and reported the required information.

Cases: THDL-01, THDL-04, and THDL-05.

STV-AM-17. Test-hdl logs how many of each command is sent and how many of each command is blocked for each disk drive.

Code review found an implausible failure mode. For all the tests, tally13 was run first. In THDL-04 test-hdl sent all write commands, of which none were blocked since no SWB was running. In THDL-05 vtblksom was run, then test-hdl sent all commands. In THDL-06 vtblock was run, then test-hdl sent all commands. In every case, test-hdl logged the number of commands it sent and how many were blocked, for each disk drive.

Cases: THDL-01, THDL-04, THDL-05, and THDL-06.

STV-AM-18. Test-hdl logs that all, not all or no commands were blocked for each disk drive.

Code review passed: test-hdl logs that, category by category, all, not all or no commands were blocked. For all the dynamic tests, tally13 was run first. In THDL-04 test-hdl sent all write commands, which were not blocked since no SWB was running, and test-hdl reported no commands were blocked. In THDL-05 vtblksom was run, to block commands by number code not function, then test-hdl sent all commands. Test-hdl reported the correct results: for configuration commands, no commands were blocked, and for all other categories of commands, not all commands were blocked. In THDL-06 vtblock was run, to block all commands, then test-hdl sent all commands. For all categories of commands, test-hdl correctly reported all commands were blocked.

Cases: THDL-01, THDL-04, THDL-05, and THDL-06.

STV-AM-19. Test-hdl logs if any commands were received, but not sent.

Code review found an implausible, failure mode. For THDL-05, first tally13 was run. Then vtblksom was run to block commands above 0x40 and to change any 0x80 command to 0x81 and pass it. Then test-hdl was run to send all commands. No message suggested that the 0x81 command received by tally13 had not been sent by test-hdl. (Command counts were confirmed by running vtreport.)

Cases: THDL-01 and THDL-05.

5.1.3 T-off

STV-AM-20. When executed, t-off logs the following information: program name, file names, version numbers and date and time of creation of each source file, system date and time program execution begins, and date and time compiled.

Code review passed. The program logged all the information, except explicitly and separately listing the program name.

Cases: TOFF-01 and TOFF-02.

STV-AM-21. When executed, t-off logs the following information: command line, including any command line options, test case ID, operator ID (initials or name), name of the computer on which the program is executed.

Code review passed. The program logged all the information.

Cases: TOFF-01 and TOFF-02.

STV-AM-22. If tally13 is not present, t-off issues a message and exits.

Code review passed. The program t-off was run (without tally13). It reported that the test harness was not active and exited.

Cases: TOFF-01 and TOFF-02.

STV-AM-23. T-off commands tally13 to passive mode.

Code review passed. The program tally13 was run, then vtact, to put tally13 in active mode, then t-off. To determine the mode, dir a: then dir c: were run. The output was correct.

Cases: TOFF-01 and TOFF-03.

5.1.4 Sig-log

STV-AM-24. When executed, sig-log logs the following information: program name, file names, version numbers and date and time of creation of each source file, system date and time program execution begins, and date and time compiled.

Code review passed. The program logged all the information, except explicitly and separately listing the program name.

Cases: SIGL-01 and SIGL-02.

STV-AM-25. When executed, sig-log logs the following information: command line, including any command line options, test case ID, operator ID (initials or name), name of the computer on which the program is executed.

Code review passed. The program logged all the information.

Cases: SIGL-01 and SIGL-02.

STV-AM-26. Sig-log asks the operator if an audio or visual signal was observed and logs a positive response.

Code review passed. The program prompted the operator. After the operator hit "y" and "enter", a positive response was logged.

Cases: SIGL-01 and SIGL-02.

STV-AM-27. Sig-log asks the operator if an audio or visual signal was observed and logs a negative response.

Code review passed. The program prompted the operator. After the operator hit "n" and "enter", a negative response was logged.

Cases: SIGL-01 and SIGL-03.

5.2 Assertions for Optional Features

There are no optional features.

6 Transmittal & Testing Environment

The tests were run in the NIST CFTT lab. This section describes the hardware, that is, computers and hard disk drives, and software used for testing. All tests were run on "Max" with hard disk drives 91, AA, or 6F running MS-DOS® (Windows® 98 DOS) Version 4.10.2222.

6.1 Software Under Test Transmittal

Dr. James Lyle, NIST, supplied a floppy disk with source code and compiled versions of tally13, test-hdl, t-off, and sig-log about May 2004. The floppy also had other scripts and utilities.

6.2 Test Hardware

The host computer, Max, has the hardware components shown in Table 6-1.

Table 6-1 Extended BIOS Host Computer Hardware Components

Intel D865GBF Motherboard
BIOS: Intel/AMI BF86510A.86A.0053.P13
Intel Dual Pentium 4 3.4hz
3072M Memory
Adaptec 29160 SCSI Adapter card Ultra 160
Sony DVD RW DRU-530A
IOGEAR GIC1394 3-Port Firewire PCI card
Apacer USB 2.0 Embedded Card Reader
Two slots for removable IDE hard disk drives
Two slots for removable SCSI hard disk drives
Two slots for removable SATA hard disk drives

The hard drives used in testing are described in Table 6-2. The column labeled **Label** is an external identification for the hard drive. The column labeled **Model** is the model identification string obtained from the drive. The **Interface** column identifies the type of interface used to connect the drive to the computer. The **Usable Sectors** column documents the size of the drive in sectors. The column labeled **Gbyte** gives the size of the drive in gigabytes.

Table 6-2 Hard Drives Used in Testing

Label	Model	Interface	Usable Sectors	Gbyte
6F	Maxtor 6Y060L0	IDE	120103200	61.49
91	WDC WD300BB-OOCAAO	IDE	58633344	30.02
AA	Maxtor 53073H4	IDE	60030432	30.73

Although the host computer never had more than two physical hard disks installed, some test cases had software sending commands designated for as many as five hard disks. In these cases, the software being tested handled the commands, but the commands were blocked before they could reach the BIOS.

6.3 Support Software

Support software was developed to support the validation of Software Write Block Test Harness (SWBT) Release 1.0 tools. *Software Write Block Testing Support Tools Validation: Test Plan, Test Design Specification, and Test Case Specification,* which is Part A, the companion NIST Internal Report, has source code for the support software in Appendix C. The software includes a program to block and change some interrupt 0x13

commands (vtblksom), block all interrupt 0x13 commands (vtblock), command tally13 to passive (vtpass) or active (vtact) mode, issue groups of interrupt 0x13 commands (vtcmdgrp), and query and report commands received by tally13 (vtreport). The programs written in assembler were compiled with Borland Turbo Assembler version 5.0. The programs written in ANSI C with some assembler were compiled with the Borland C++ compiler version 4.5.

The programs listed in Table 6-3 are required for testing.

Table 6-3 Software Required for Testing

Program	Description	Language
vtblksom	Change all interrupt 0x13 commands with a function of 0x80 (an arbitrary function) to function 0x81 and pass. Block all other interrupt 0x13 commands greater than 0x40 (an arbitrary cut off).	Assembler
vtblock	Block all interrupt 0x13 commands.	Assembler
vtpass	Command tally13 to passive mode. (A validation version of t-off.)	ANSI C with some assembler
vtact	Command tally13 to active mode. Report if tally13 returns an identifying value.	ANSI C with some assembler
vtcmdgrp	Send every command with bit N on to the specified disk drive. For N=0, send 0x1, 0x3, 0x5, etc. For N=1, send 0x2, 0x3, 0x6, 0x7, etc.	ANSI C with some assembler
vtreport	Query tally13 for number and type of commands blocked and report them.	ANSI C with some assembler

7 Interpretation of Code Review and Test Results

7.1 Test Assertion Verification

This section describes how to find information to verify each test assertion and how to interpret that information.

To determine if tally13 is in passive mode, do the following.

1. Check that tally13 started successfully.
2. Run `dir a:` (to flush buffers).
3. Run `dir c:` (to try to access a hard disk drive).

If the result is reasonable to the tester, tally13 is in passive mode.

To determine if tally13 is in active mode, do the following.

1. Check that tally13 started successfully.
2. Run `dir a:` (to flush buffers).
3. Run `dir c:` (to try to access a hard disk drive).

If the result is not reasonable to the tester, tally13 is in active mode.

STV-AM-01. When executed, tally13 writes the following information to stdout: program name, file names, version numbers and date and time of creation of each source file, system date and time program execution begins, and date and time compiled.

If code passes the review and tally13 logs the appropriate information, the test case conforms to the assertion.

STV-AM-02. Tally13 shall start running in passive mode.

If code passes the review and when tally13 first runs, it is in passive mode, the test case conforms to the assertion.

STV-AM-03. Tally13 may be switched from passive to active mode.

If code passes the review, tally13 is in passive mode, and running vtact switches tally13 to active mode, the test case conforms to the assertion.

STV-AM-04. Tally13 may be switched from active to passive mode.

If code passes the review, tally13 is in active mode, and running vtpass switches tally13 to passive mode, the test case conforms to the assertion.

STV-AM-05. Tally13 stays in passive mode until switched.

If code passes the review, tally13 is in passive mode, and tally13 stays in passive mode, the test case conforms to the assertion.

STV-AM-06. Tally13 stays in active mode until switched.

If code passes the review, tally13 is in active mode, and tally13 stays in active mode, the test case conforms to the assertion.

STV-AM-07. Tally13 allows how many of each interrupt 0x13 command is received in active mode for each disk drive to be retrieved.

If code passes the review and vtreport reports the correct number of commands for each disk drive, the test case conforms to the assertion.

STV-AM-08. An identifying value is returned via the query interface when tally13 is present.

If code passes the review and vtact reports that the identifying code was returned, the test case conforms to the assertion.

STV-AM-09. When executed, test-hdl logs the following information: program name, file names, version numbers and date and time of creation of each source file, system date and time program execution begins, and date and time compiled.

If code passes the review and test-hdl logs the appropriate information, the test case conforms to the assertion.

STV-AM-10. When executed, test-hdl logs the following information: command line, including any command line options, test case ID, command category to be tested, operator ID (initials or name), and name of the computer on which the program is executed.

If code passes the review and test-hdl logs the appropriate information, the test case conforms to the assertion.

STV-AM-11. When executed, test-hdl writes the following information to a log file: the number of installed disk drives and the external labels of each disk drive.

If code passes the review and test-hdl logs the appropriate information, the test case conforms to the assertion.

STV-AM-12. If tally13 is not running, test-hdl issues a message and exits.

If code passes the review, tally13 is not running, and test-hdl issues a message and exits, the test case conforms to the assertion.

STV-AM-13. Test-hdl commands tally13 to active mode.

If code passes the review, tally13 is in passive mode, test-hdl runs, and tally13 is in active mode, the test case conforms to the assertion.

STV-AM-14. If the number of each command received for each disk drive is not zero, test-hdl logs the command and disk drive.

If code passes the review and test-hdl reports the command and disk drive of any count that is not zero, the test case conforms to the assertion.

STV-AM-15. Test-hdl sends each interrupt 0x13 command in the specified category to each disk drive.

If code passes the review and vtreport reports that commands were sent when specified, the test case conforms to the assertion.

STV-AM-16. For each command sent, test-hdl logs the command code, disk drive issued to, return count, status register value, and carry flag setting.

If code passes the review and test-hdl logs information about each command, the test case conforms to the assertion.

STV-AM-17. Test-hdl logs how many of each command is sent and how many of each command is blocked for each disk drive.

If code passes the review and test-hdl logs how many commands are blocked and sent, the test case conforms to the assertion.

STV-AM-18. Test-hdl logs that all, not all or no commands were blocked for each disk drive.

If code passes the review and test-hdl summarizes commands blocked, the test case conforms to the assertion.

STV-AM-19. Test-hdl logs if any commands were received, but not sent.

If code passes the review and test-hdl logs unsent commands that are received, the test case conforms to the assertion.

STV-AM-20. When executed, t-off logs the following information: program name, file names, version numbers and date and time of creation of each source file, system date and time program execution begins, and date and time compiled.

If code passes the review and t-off logs the appropriate information, the test case conforms to the assertion.

STV-AM-21. When executed, t-off logs the following information: command line, including any command line options, test case ID, operator ID (initials or name), name of the computer on which the program is executed.

If code passes the review and t-off logs the appropriate information, the test case conforms to the assertion.

STV-AM-22. If tally13 is not present, t-off issues a message and exits.

If code passes the review, t-off runs, and t-off reports the test harness is not active and exits, the test case conforms to the assertion.

STV-AM-23. T-off commands tally13 to passive mode.

If code passes the review, tally13 is in active mode, t-off runs, and dir commands indicate tally13 is in passive mode, the test case conforms to the assertion.

STV-AM-24. When executed, sig-log logs the following information: program name, file names, version numbers and date and time of creation of each source file, system date and time program execution begins, and date and time compiled.

If code passes the review and sig-log logs the appropriate information, the test case conforms to the assertion.

STV-AM-25. When executed, sig-log logs the following information: command line, including any command line options, test case ID, operator ID (initials or name), name of the computer on which the program is executed.

If code passes the review and sig-log logs the appropriate information, the test case conforms to the assertion.

STV-AM-26. Sig-log asks the operator if an audio or visual signal was observed and logs a positive response.

If code passes the review, sig-log prompts the operator, and sig-log logs that a signal is observed, the test case conforms to the assertion.

STV-AM-27. Sig-log asks the operator if an audio or visual signal was observed and logs a negative response.

If code passes the review, sig-log prompts the operator, and sig-log logs that no signal is observed, the test case conforms to the assertion.

7.2 Code Review and Test Results Summary Key

This report presents a summary of the actual results. Table 7-1describes each section of a code review or test report summary.

Table 7-1 Description of Code Review or Test Report Summary

Heading	Description
(first line)	Code review or test case ID, Name and version of software tested or reviewed.
Case Summary:	Test case summary. From *Software Write Block Testing Tools Validation.*
Assertions tested/reviewed	The assertion(s) tested or reviewed by the test case. From *Software Write Block Testing Tools Validation.*
Tester/Reviewers	Name or initials of person(s) executing test procedure or reviewing the code.
Test/Review Date	Time and date the test or review started.
Test Hardware	Name of computer and hard drive(s) used in the test.
Test Software	Name(s) and version(s) of software used in the test. (This

Heading	Description
	does not include the software tested.)
Code reviews have one "Review Highlights" section. Tests have a pair of "Command(s) Executed" and "Log File Highlights" sections for each step of the test.	
Review Highlights	The review highlights have one subsection for each file reviewed. The file name is given at the beginning of each section. Each subsection has one or more notes. Each note has the relevant line number(s) and the motivation for the note. The relevant code may be included. There may be a clarify comment. The last line of each note is in *italic* and is the assessment of the impact on results. A blank line separates notes.
Command(s) Executed	The command(s) executed in this step of the test.

Log File Highlights	This section has selected entries from the combined test case log file. Each program produces output that is included in the combined log file.
	
	The `dir a:` command flushes buffers so the next command must access a hard disk drive. Results from `dir a:` commands are never included.
	
	When access to a hard disk drive is not blocked, a `dir c:` command lists files, directories, and other information. On the other hand, if `dir c:` produced nonsense, e.g.,
	
	`Volume in drive C is`
	`"  <action`
	` Volume Serial Number is 5411-4A8E`
	` Directory of C:\`
	
	`Versio n:  1,869,181,810  02-16-96 10:02a`
	`28`
	`         1,936,876,886  02-19-03  8:50a`
	`ion 1    2     842,674,225  09-00-28  6:33a`
	`tally13  was 1,633,841,765  01-00-10  4:01a`
	`         4 file(s)       5,991.53 MB`
	`         0 dir(s)   2,838,558,720 bytes free`
	
	access to the hard disk drive was blocked. (The output often contains fragments and values from previous commands.)
	
	The programs vtact, vtpass, vtcmdgrp, and vtreport all report the command line used to run the program. This line begins with the string CMD. They then report identifying information (the file name, version, and date and time first

Heading	Description
	put under source code control or "creation") for each source code component. The compile date and time for the executable program is reported. The vtact program additionally reports whether or not the special identifying code for tally13 was returned. Neither vtpass nor vtcmdgrp report anything else. The vtreport program reports each of five sets of counts from tally13. (Even if the computer running the tests has fewer than five disks, tally13 has five sets of counts, and vtreport reports all five sets.) Counts for all possible commands, from 0x00 to 0xff, are listed, 16 commands at a time. (The table is too narrow to show all 16 on the same line, so three counts wrap around to the next line.) The first line has the last digits of the hexadecimal code of the command. Each row starts with the hexadecimal code of the first command. The programs tally13, vtblock, and vtblksom report the date and time the executable program was compiled. They then report identifying information (the file name, version, and date and time first put under source code control or "creation") for the source code component. Finally they report the date and time run. None of them produce any other directly visible output. The test-hdl, t-off, and sig-log programs all send identifying information to a program-specific log file. The format of the output is as follows: 1. Command line. The command line used to execute the program. This line begins with the string CMD. 2. Case number. 3. Date and time. 4. Version. The file name, version, and date and time first put under source code control (creation) of each source code component are listed. The compile date and time for the executable program is listed. 5. Operator. The operator running the test. 6. Host. The host computer running the test. In addition test-hdl records two more items: 7. Command set. The category of interrupt 0x13 functions

Heading	Description
	tested by this case. 8. Drives. The number of drives and the external drive label for each drive. In the log of test-hdl, the next two items are repeated for each installed drive. They are records of commands sent on the 0x13 interrupt and presumed action taken by any program to either block or allow each command sent. 9. List of commands sent. Each line of the list has 9 columns: sequence number, test case number, command code in hex (Cmd), drive number in hex (Drv), action taken by any interrupt 0x13 tool (either Blocked or Allowed), return status (0000 means success, 0300 or 0100 means fail), carry flag value (labeled Cry with values of either On indicating failure status, or Off indicating success status), count of the number of times the command was allowed by any interrupt 0x13 tool, and the command name (or undefined for commands in the miscellaneous category). 10. Summary of commands for the drive. The message indicates the number of commands blocked out of the number of commands sent. 11. Last in the test-hdl log is a summary of all commands sent to all drives: the number of commands sent, the number blocked and the number allowed (not blocked). The log file from t-off does not have additional information. Any output of t-off, i.e. a message that tally13 is not running, is included in the Log File Highlights before the log file. The last line of a log file from sig-log reports if the operator observed a signal (SIGNAL: y) or not (SIGNAL: n). The output of sig-log, a prompt to the operator, is included in the Log File Highlights before the log file.
Results	A table of expected and actual results for each assertion tested or considered in the review.

8 Code Review and Test Results Summaries

<table>
<tr><td colspan="2">Code Review T13-01 – tally13 version 1.1</td></tr>
<tr><td>Assertions Reviewed</td><td>STV-AM-01. When executed, tally13 writes the following information to stdout: program name, file names, version numbers and date and time of creation of each source file, system date and time program execution begins, and date and time compiled.
STV-AM-02. Tally13 shall start running in passive mode.
STV-AM-03. Tally13 may be switched from passive to active mode.
STV-AM-04. Tally13 may be switched from active to passive mode.
STV-AM-05. Tally13 stays in passive mode until switched.
STV-AM-06. Tally13 stays in active mode until switched.
STV-AM-07. Tally13 allows how many of each interrupt 0x13 command is received in active mode for each disk drive to be retrieved.
STV-AM-08. An identifying value is returned via the query interface when tally13 is present.</td></tr>
<tr><td>Reviewers</td><td>PEB, SM, KR, JRL</td></tr>
<tr><td>Review Date</td><td>Tue Aug 3 2004</td></tr>
<tr><td>Review Highlights</td><td>tally13.asm
Lines 52 – 59 unused macro px
should not cause invalid results

Line 121 incorrect comment
Should say, the function is in AL
should not cause invalid results

Lines 131 & 137 may access array out of bound
<code>mov CX,CS:[BX+SI]</code>
<code>mov CS:[BX+SI],CX</code>
If used with more than five drives, array accesses will be out of bounds.
should not cause invalid results if used properly

Line 223 commented out code (lea)
should not cause invalid results

Line 221 incorrect comment
Should say, print start up message
should not cause invalid results</td></tr>
<tr><td>Results</td><td>
<table>
<tr><th>Assertion</th><th>Expected Results</th><th>Actual Results</th></tr>
<tr><td>AM-01</td><td>Should satisfy assertion</td><td>Should satisfy assertion</td></tr>
</table>
</td></tr>
</table>

AM-02	Should satisfy assertion	Should satisfy assertion
AM-03	Should satisfy assertion	Should satisfy assertion
AM-04	Should satisfy assertion	Should satisfy assertion
AM-05	Should satisfy assertion	Should satisfy assertion
AM-06	Should satisfy assertion	Should satisfy assertion
AM-07	Should satisfy assertion	Should satisfy assertion if used with no more than five drives
AM-08	Should satisfy assertion	Should satisfy assertion

Case T13-02 – tally13 version 1.1	
Case Summary	Check that tally13 reports file and run information, starts in passive mode, can be switched between modes, stays in mode until switched, and returns an identifying value.
Assertions Tested	STV-AM-01. When executed, tally13 writes the following information to stdout: program name, file names, version numbers and date and time of creation of each source file, system date and time program execution begins, and date and time compiled. STV-AM-02. Tally13 shall start running in passive mode. STV-AM-03. Tally13 may be switched from passive to active mode. STV-AM-04. Tally13 may be switched from active to passive mode. STV-AM-05. Tally13 stays in passive mode until switched. STV-AM-06. Tally13 stays in active mode until switched. STV-AM-08. An identifying value is returned via the query interface when tally13 is present.
Tester	PEB
Test Date	Tue Jul 20 12 2004
Test Hardware	Machine: Max Disk drives: 91 AA
Test Software	Windows 98 [Version 4.10.2222] vtact 1.3 vtpass 1.3
Command(s) Executed	`tally13`

Log File Highlights	`Monitor BIOS interrupt 13h (disk service)`
	`tally13  compiled on 07/29/03 at 07:33:17`
	`@(#) Version 1.1 Created 07/29/03 at 07:28:05`
	`Now (07/20/04 at 12:17:35) Going . . .  TSR`

Command(s) Executed	`dir a:` `dir c:`

Log File Highlights	`COMMAND  COM        93,890  04-23-99 10:22p`
	`WINDOWS       <DIR>         11-09-02 11:49a`
	`NETLOG   TXT        19,019  11-09-02 11:06p`
	`CONFIG   SYS            0  11-09-02 11:07p`
	`AUTOEXEC BAT            0  11-09-02 11:07p`
	`MYDOCU~1       <DIR>         11-09-02 11:10p`

	PROGRA~1 <DIR> 11-09-02 11:49a 4 file(s) 112,909 bytes 3 dir(s) 2,838,558,720 bytes free
Command(s) Executed	vtact
Log File Highlights	CMD: A:\VTACT.EXE Version: @(#) VTACT.CPP Version 1.3 Created 07/20/04 at 10:21:28 @(#) WB-DEFS.H Version 1.2 Created 07/20/04 at 10:21:28 Compiled on Jul 20 2004 at 11:34:58 Identifying code for tally13 was returned
Command(s) Executed	dir a: dir c:
Log File Highlights	Volume in drive C is " <action Volume Serial Number is 5411-4A8E Directory of C:\ Versio n: 1,869,181,810 02-16-96 10:02a 28 1,936,876,886 02-19-03 8:50a ion 1 2 842,674,225 09-00-28 6:33a tally13 was 1,633,841,765 01-00-10 4:01a 4 file(s) 5,991.53 MB 0 dir(s) 2,838,558,720 bytes free
Command(s) Executed	vtact dir a: dir c:
Log File Highlights	CMD: A:\VTACT.EXE Version: @(#) VTACT.CPP Version 1.3 Created 07/20/04 at 10:21:28 @(#) WB-DEFS.H Version 1.2 Created 07/20/04 at 10:21:28 Compiled on Jul 20 2004 at 11:34:58 Identifying code for tally13 was returned Volume in drive C is ction>dir c Volume Serial Number is 5411-4A8E Directory of C:\ ed 07/20 /04 538,976,288 00-10-96 1:41a ated 07/ 20/ <DIR> 09-24-86 6:17a Identify ing 1,935,767,328 11-12-40 1:35p <action> dir 1,631,330,336 09-00-86 4:17a batim>" 0 4 file(s) 4,106,073,952 bytes 1 dir(s) 2,838,558,720 bytes free
Command(s) Executed	vtpass dir a: dir c:
Log File Highlights	CMD: A:\VTPASS.EXE Version: @(#) VTPASS.CPP Version 1.3 Created 07/20/04 at 10:21:28 Compiled on Jul 20 2004 at 11:34:33 Volume in drive C is W98 Volume Serial Number is 3DCC-D91D Directory of C:\ COMMAND COM 93,890 04-23-99 10:22p WINDOWS <DIR> 11-09-02 11:49a NETLOG TXT 19,019 11-09-02 11:06p CONFIG SYS 0 11-09-02 11:07p AUTOEXEC BAT 0 11-09-02 11:07p MYDOCU~1 <DIR> 11-09-02 11:10p PROGRA~1 <DIR> 11-09-02 11:49a 4 file(s) 112,909 bytes 3 dir(s) 2,838,558,720 bytes free
Command(s)	vtpass dir a:

Executed	`dir c:`

Log File Highlights	`CMD: A:\VTPASS.EXE`
	`Version: @(#) VTPASS.CPP Version 1.3 Created 07/20/04 at 10:21:28`
	`Compiled on Jul 20 2004 at 11:34:33`
	
	`Volume in drive C is W98`
	`Volume Serial Number is 3DCC-D91D`
	`Directory of C:\`
	
	`COMMAND COM 93,890 04-23-99 10:22p`
	`WINDOWS <DIR> 11-09-02 11:49a`
	`NETLOG TXT 19,019 11-09-02 11:06p`
	`CONFIG SYS 0 11-09-02 11:07p`
	`AUTOEXEC BAT 0 11-09-02 11:07p`
	`MYDOCU~1 <DIR> 11-09-02 11:10p`
	`PROGRA~1 <DIR> 11-09-02 11:49a`
	`4 file(s) 112,909 bytes`
	`3 dir(s) 2,838,558,720 bytes free`

Results	

Assertion	Expected Results	Actual Results
AM-01	Tally13 reports program name, file information, and system time.	Tally13 reports program name, some file information, and system time.
AM-02	Dir command returns expected result	Dir command returns expected result
AM-08	Vtact reports an identifying value returned	Vtact reports an identifying value returned
AM-03	Dir command returns nonsense.	Dir command returns nonsense.
AM-06	Dir command returns nonsense.	Dir command returns nonsense.
AM-04	Dir command returns expected result	Dir command returns expected result
AM-05	Dir command returns expected result	Dir command returns expected result

Case T13-03 – tally13 version 1.1	
Case Summary	Check that tally13 counts commands received in active mode.
Assertion Tested	STV-AM-07. Tally13 allows how many of each interrupt 0x13 command is received in active mode for each disk drive to be retrieved.
Tester	PEB
Test Date	Tue Jul 20 12:29 2004
Test Hardware	Machine: Max Disk drives: 91 AA
Test Software	Windows 98 [Version 4.10.2222] vtact 1.3 vtpass 1.3 vtcmdgrp 1.3 vtreport 1.3

Command(s) Executed	`tally13`
	`dir a:`
	`dir c:`
	`vtreport`

Log File Highlights	`Monitor BIOS interrupt 13h (disk service)`
	`tally13 compiled on 07/29/03 at 07:33:17`
	`@(#) Version 1.1 Created 07/29/03 at 07:28:05`

```
Now (07/20/04 at 12:30:38) Going . . .  TSR

 Volume in drive C is W98
 Volume Serial Number is 3DCC-D91D
 Directory of C:\

COMMAND  COM        93,890  04-23-99 10:22p
WINDOWS        <DIR>        11-09-02 11:49a
NETLOG   TXT        19,019  11-09-02 11:06p
CONFIG   SYS             0  11-09-02 11:07p
AUTOEXEC BAT             0  11-09-02 11:07p
MYDOCU~1       <DIR>        11-09-02 11:10p
PROGRA~1       <DIR>        11-09-02 11:49a
         4 file(s)        112,909 bytes
         3 dir(s)   2,838,558,720 bytes free

CMD: A:\VTREPORT.EXE
Version:  @(#)  VTREPORT.CPP  Version  1.3  Created  07/20/04  at
10:21:28
Compiled on Jul 20 2004 at 11:34:23
Drive 0 (80)
Command 0 1 2 3 4 5 6 7 8 9 a b c d e f 0 1 2 3 4 5 6 7 8 9 a b c
d e f
     00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
     20 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
     40 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
     60 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
     80 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
     a0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
     c0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
     e0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
Drive 1 (81)
Command 0 1 2 3 4 5 6 7 8 9 a b c d e f 0 1 2 3 4 5 6 7 8 9 a b c
d e f
     00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
     20 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
     40 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
     60 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
     80 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
     a0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
     c0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
     e0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
Drive 2 (82)
Command 0 1 2 3 4 5 6 7 8 9 a b c d e f 0 1 2 3 4 5 6 7 8 9 a b c
d e f
     00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
     20 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
     40 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
     60 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
     80 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
```

	a0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 c0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 e0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 Drive 3 (83) Command 0 1 2 3 4 5 6 7 8 9 a b c d e f 0 1 2 3 4 5 6 7 8 9 a b c d e f 00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 20 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 40 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 60 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 80 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 a0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 c0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 e0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 Drive 4 (84) Command 0 1 2 3 4 5 6 7 8 9 a b c d e f 0 1 2 3 4 5 6 7 8 9 a b c d e f 00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 20 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 40 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 60 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 80 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 a0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 c0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 e0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Command(s) Executed	vtact
Log File Highlights	CMD: A:\VTACT.EXE Version: @(#) VTACT.CPP Version 1.3 Created 07/20/04 at 10:21:28 @(#) WB-DEFS.H Version 1.2 Created 07/20/04 at 10:21:28 Compiled on Jul 20 2004 at 11:34:58 Identifying code for tally13 was returned
Command(s) Executed	vtcmdgrp 0 1 vtreport
Log File Highlights	CMD: A:\VTCMDGRP.EXE 0 1 Version: @(#) VTCMDGRP.CPP Version 1.3 Created 07/20/04 at 10:21:28 Compiled on Jul 20 2004 at 11:34:43 CMD: A:\VTREPORT.EXE Version: @(#) VTREPORT.CPP Version 1.3 Created 07/20/04 at 10:21:28 Compiled on Jul 20 2004 at 11:34:23 . . . Drive 1 (81) Command 0 1 2 3 4 5 6 7 8 9 a b c d e f 0 1 2 3 4 5 6 7 8 9 a b c d e f 00 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0

	2 0 2 20 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 40 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 60 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 80 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 a0 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 c0 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 e0 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 . . .
Command(s) Executed	vtcmdgrp 1 2 vtreport
Log File Highlights	CMD: A:\VTCMDGRP.EXE 1 2 Version: @(#) VTCMDGRP.CPP Version 1.3 Created 07/20/04 at 10:21:28 Compiled on Jul 20 2004 at 11:34:43 CMD: A:\VTREPORT.EXE Version: @(#) VTREPORT.CPP Version 1.3 Created 07/20/04 at 10:21:28 Compiled on Jul 20 2004 at 11:34:23 . . . Drive 2 (82) Command 0 1 2 3 4 5 6 7 8 9 a b c d e f 0 1 2 3 4 5 6 7 8 9 a b c d e f 00 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 20 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 40 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 60 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 80 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 a0 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 c0 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 e0 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 . . .
Command(s) Executed	vtcmdgrp 2 3 vtreport
Log File Highlights	CMD: A:\VTCMDGRP.EXE 2 3 Version: @(#) VTCMDGRP.CPP Version 1.3 Created 07/20/04 at 10:21:28 Compiled on Jul 20 2004 at 11:34:43 CMD: A:\VTREPORT.EXE Version: @(#) VTREPORT.CPP Version 1.3 Created 07/20/04 at 10:21:28 Compiled on Jul 20 2004 at 11:34:23 . . . Drive 3 (83) Command 0 1 2 3 4 5 6 7 8 9 a b c d e f 0 1 2 3 4 5 6 7 8 9 a b c d e f

	00 0 0 0 0 2 2 2 2 0 0 0 0 2 2 2 2 0 0 0 0 2 2 2 2 0 0 0 0 2 2 2 2 20 0 0 0 0 2 2 2 2 0 0 0 0 2 2 2 2 0 0 0 0 2 2 2 2 0 0 0 0 2 2 2 2 40 0 0 0 0 2 2 2 2 0 0 0 0 2 2 2 2 0 0 0 0 2 2 2 2 0 0 0 0 2 2 2 2 60 0 0 0 0 2 2 2 2 0 0 0 0 2 2 2 2 0 0 0 0 2 2 2 2 0 0 0 0 2 2 2 2 80 0 0 0 0 2 2 2 2 0 0 0 0 2 2 2 2 0 0 0 0 2 2 2 2 0 0 0 0 2 2 2 2 a0 0 0 0 0 2 2 2 2 0 0 0 0 2 2 2 2 0 0 0 0 2 2 2 2 0 0 0 0 2 2 2 2 c0 0 0 0 0 2 2 2 2 0 0 0 0 2 2 2 2 0 0 0 0 2 2 2 2 0 0 0 0 2 2 2 2 e0 0 0 0 0 2 2 2 2 0 0 0 0 2 2 2 2 0 0 0 0 2 2 2 2 0 0 0 0 2 2 2 2 . . .
Command(s) Executed	vtcmdgrp 3 4 vtreport
Log File Highlights	CMD: A:\VTCMDGRP.EXE 3 4 Version: @(#) VTCMDGRP.CPP Version 1.3 Created 07/20/04 at 10:21:28 Compiled on Jul 20 2004 at 11:34:43 CMD: A:\VTREPORT.EXE Version: @(#) VTREPORT.CPP Version 1.3 Created 07/20/04 at 10:21:28 Compiled on Jul 20 2004 at 11:34:23 . . . Drive 4 (84) Command 0 1 2 3 4 5 6 7 8 9 a b c d e f 0 1 2 3 4 5 6 7 8 9 a b c d e f 00 0 0 0 0 0 0 0 0 2 2 2 2 2 2 2 2 0 0 0 0 0 0 0 0 2 2 2 2 2 2 2 2 20 0 0 0 0 0 0 0 0 2 2 2 2 2 2 2 2 0 0 0 0 0 0 0 0 2 2 2 2 2 2 2 2 40 0 0 0 0 0 0 0 0 2 2 2 2 2 2 2 2 0 0 0 0 0 0 0 0 2 2 2 2 2 2 2 2 60 0 0 0 0 0 0 0 0 2 2 2 2 2 2 2 2 0 0 0 0 0 0 0 0 2 2 2 2 2 2 2 2 80 0 0 0 0 0 0 0 0 2 2 2 2 2 2 2 2 0 0 0 0 0 0 0 0 2 2 2 2 2 2 2 2 a0 0 0 0 0 0 0 0 0 2 2 2 2 2 2 2 2 0 0 0 0 0 0 0 0 2 2 2 2 2 2 2 2 c0 0 0 0 0 0 0 0 0 2 2 2 2 2 2 2 2 0 0 0 0 0 0 0 0 2 2 2 2 2 2 2 2 e0 0 0 0 0 0 0 0 0 2 2 2 2 2 2 2 2 0 0 0 0 0 0 0 0 2 2 2 2 2 2 2 2
Command(s) Executed	vtcmdgrp 4 2 vtreport
Log File Highlights	CMD: A:\VTCMDGRP.EXE 4 2 Version: @(#) VTCMDGRP.CPP Version 1.3 Created 07/20/04 at 10:21:28 Compiled on Jul 20 2004 at 11:34:43 CMD: A:\VTREPORT.EXE Version: @(#) VTREPORT.CPP Version 1.3 Created 07/20/04 at 10:21:28 Compiled on Jul 20 2004 at 11:34:23 . . . Drive 2 (82) Command 0 1 2 3 4 5 6 7 8 9 a b c d e f 0 1 2 3 4 5 6 7 8 9 a b c d e f 00 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 2 2 4 4 2 2 4 4 2 2 4 4 2

	2 4 4 20 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 2 2 4 4 2 2 4 4 2 2 4 4 2 2 4 4 40 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 2 2 4 4 2 2 4 4 2 2 4 4 2 2 4 4 60 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 2 2 4 4 2 2 4 4 2 2 4 4 2 2 4 4 80 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 2 2 4 4 2 2 4 4 2 2 4 4 2 2 4 4 a0 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 2 2 4 4 2 2 4 4 2 2 4 4 2 2 4 4 c0 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 2 2 4 4 2 2 4 4 2 2 4 4 2 2 4 4 e0 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 2 2 4 4 2 2 4 4 2 2 4 4 2 2 4 4 . . .
Command(s) Executed	vtcmdgrp 5 3 vtreport
Log File Highlights	CMD: A:\VTCMDGRP.EXE 5 3 Version: @(#) VTCMDGRP.CPP Version 1.3 Created 07/20/04 at 10:21:28 Compiled on Jul 20 2004 at 11:34:43 CMD: A:\VTREPORT.EXE Version: @(#) VTREPORT.CPP Version 1.3 Created 07/20/04 at 10:21:28 Compiled on Jul 20 2004 at 11:34:23 . . . Drive 3 (83) Command 0 1 2 3 4 5 6 7 8 9 a b c d e f 0 1 2 3 4 5 6 7 8 9 a b c d e f 00 0 0 0 0 2 2 2 2 0 0 0 0 2 2 2 2 0 0 0 0 2 2 2 2 0 0 0 0 2 2 2 2 20 2 2 2 2 4 4 4 4 2 2 2 2 4 4 4 4 2 2 2 2 4 4 4 4 2 2 2 2 4 4 4 4 40 0 0 0 0 2 2 2 2 0 0 0 0 2 2 2 2 0 0 0 0 2 2 2 2 0 0 0 0 2 2 2 2 60 2 2 2 2 4 4 4 4 2 2 2 2 4 4 4 4 2 2 2 2 4 4 4 4 2 2 2 2 4 4 4 4 80 0 0 0 0 2 2 2 2 0 0 0 0 2 2 2 2 0 0 0 0 2 2 2 2 0 0 0 0 2 2 2 2 a0 2 2 2 2 4 4 4 4 2 2 2 2 4 4 4 4 2 2 2 2 4 4 4 4 2 2 2 2 4 4 4 4 c0 0 0 0 0 2 2 2 2 0 0 0 0 2 2 2 2 0 0 0 0 2 2 2 2 0 0 0 0 2 2 2 2 e0 2 2 2 2 4 4 4 4 2 2 2 2 4 4 4 4 2 2 2 2 4 4 4 4 2 2 2 2 4 4 4 4 . . .
Command(s) Executed	vtcmdgrp 6 1 vtreport
Log File Highlights	CMD: A:\VTCMDGRP.EXE 6 1 Version: @(#) VTCMDGRP.CPP Version 1.3 Created 07/20/04 at 10:21:28 Compiled on Jul 20 2004 at 11:34:43 CMD: A:\VTREPORT.EXE Version: @(#) VTREPORT.CPP Version 1.3 Created 07/20/04 at 10:21:28 Compiled on Jul 20 2004 at 11:34:23 . . . Drive 1 (81) Command 0 1 2 3 4 5 6 7 8 9 a b c d e f 0 1 2 3 4 5 6 7 8 9 a b c d e f

	00 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 20 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 40 2 4 2 4 2 4 2 4 2 4 2 4 2 4 2 4 2 4 2 4 2 4 2 4 2 4 2 4 2 4 60 2 4 2 4 2 4 2 4 2 4 2 4 2 4 2 4 2 4 2 4 2 4 2 4 2 4 2 4 2 4 80 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 a0 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 c0 2 4 2 4 2 4 2 4 2 4 2 4 2 4 2 4 2 4 2 4 2 4 2 4 2 4 2 4 2 4 e0 2 4 2 4 2 4 2 4 2 4 2 4 2 4 2 4 2 4 2 4 2 4 2 4 2 4 2 4 2 4 . . .
Results	**Assertion** / **Expected Results** / **Actual Results** AM-07 / Counts commands received in active mode. / Counts commands received in active mode.

Code Review THDL-01 – test-hdl version 1.1	
Case Summary	Review source code for possible errors and conformance to assertions.

Assertions Reviewed	STV-AM-09. When executed, test-hdl logs the following information: program name, file names, version numbers and date and time of creation of each source file, system date and time program execution begins, and date and time compiled. STV-AM-10. When executed, test-hdl logs the following information: command line, including any command line options, test case ID, command category to be tested, operator ID (initials or name), and name of the computer on which the program is executed. STV-AM-11. When executed, test-hdl writes the following information to a log file: the number of installed disk drives and the external labels of each disk drive. STV-AM-12. If tally13 is not running, test-hdl issues a message and exits. STV-AM-13. Test-hdl commands tally13 to active mode. STV-AM-14. If the number of each command received for each disk drive is not zero, test-hdl logs the command and disk drive. STV-AM-15. Test-hdl sends each interrupt 0x13 command in the specified category to each disk drive. STV-AM-16. For each command sent, test-hdl logs the command code, disk drive issued to, return count, status register value, and carry flag setting. STV-AM-17. Test-hdl logs how many of each command is sent and how many of each command is blocked for each disk drive. STV-AM-18. Test-hdl logs that all, not all or no commands were blocked for each disk drive. STV-AM-19. Test-hdl logs if any commands were received, but not sent.
Reviewers	PEB, KR, JRL
Review Date	Thu Jul 29 14:00:00 2004
Review Highlights	test-hdl.cpp Line 39 “quered” misspelled. *should not cause invalid results* Many useless initialization: lines 126, 132, 134, 137, 226, 269, etc. *should not cause invalid results* Line 62 incorrect comment Says it exits if tallies are not zero, but it does not exit. *should not cause invalid results* Line 136 incorrect comment

variable expected is number of commands *not* blocked
should not cause invalid results

Line 165 questionable statement
Is assembler jump out of block ok? Response: yes, it is ok.
should not cause invalid results

Line 288 lone backslash in string: `"A:\SWB-LOG.TXT "`
should not cause invalid results

Line 290 format string has `%s`, but no string (file name) passed
should not cause invalid results

AM-17 and AM-19 test-hdl may incorrectly report commands allowed when blocked (or blocked when transformed)

Test-hdl counts a command as blocked or passed depending on tally13's count *for that command*, which test-hdl queries just after sending the command. If a command is received by tally13 after test-hdl checks that all counts are zero (but before test-hdl sends the command), the count is nonzero and test-hdl reports the command allowed when it was blocked.

Suppose an SWB program changes, say, a 0x03 (write sectors) into a 0x02 (read sectors). Test-hdl reports that 0x03 is blocked (but the tester sees that the number of commands not blocked doesn't match the expected number). If a program changes a read to a write (but blocks incoming writes), test-hdl reports that writes are allowed (when they are blocked).

Suggestion: check tally13's count just before sending a command and compare it with the count retrieved just after sending the command.

should not cause invalid results

wb-defs.h
Line 40 unused variable (`m_names`)
should not cause invalid results

Results

Assertion	Expected Results	Actual Results
AM-09	Should satisfy assertion	Should satisfy assertion
AM-10	Should satisfy assertion	Should satisfy assertion
AM-11	Should satisfy assertion	Should satisfy assertion
AM-12	Should satisfy assertion	Should satisfy assertion
AM-13	Should satisfy assertion	Should satisfy assertion
AM-14	Should satisfy assertion	Does not log which command has non-zero count. Otherwise should satisfy assertion

AM-15	Should satisfy assertion	Should satisfy assertion
AM-16	Should satisfy assertion	Should satisfy assertion
AM-17	Should satisfy assertion	May incorrectly report a command allowed when it is blocked
AM-18	Should satisfy assertion	Should satisfy assertion
AM-19	Should satisfy assertion	May miss a command received, but not sent

Case THDL-02 – test-hdl version 1.1	
Case Summary	Check that test-hdl reports file information and date and time run. Check that it issues a message and exits since tally13 is not running.
Assertions Tested	STV-AM-09. When executed, test-hdl logs the following information: program name, file names, version numbers and date and time of creation of each source file, system date and time program execution begins, and date and time compiled. STV-AM-12. If tally13 is not running, test-hdl issues a message and exits.
Tester	PEB
Test Date	Tue Jul 20 12:40 2004
Test Hardware	Machine: Max Disk drives: 91 AA
Test Software	Windows 98 [Version 4.10.2222]
Command(s) Executed	`test-hdl THDL-02 Max PEB a 91 AA`

Log File Highlights	`Test Harness is not active`
	
	`CMD: A:\TEST-HDL.EXE THDL-02 Max PEB a 91 AA`
	`Case: THDL-02`
	`Command set: All`
	`Date: Tue Jul 20 12:41:41 2004`
	
	`Version: @(#) test-hdl.cpp Version 1.1 Created 08/23/03 at 10:13:51`
	`@(#) wb-defs.h Version 1.2 Created 08/31/03 at 08:18:19`
	`Compiled on Aug 31 2003 at 08:10:54`
	`Operator: PEB`
	`Host: Max`
	`Number of drives 2, Drives: 91 AA`

Results	**Assertion**	**Expected Results**	**Actual Results**
	AM-09	Report file and date information.	Report file and date information.
	AM-12	Report that tally13 is not running and exit	Report that tally13 is not running and exit

Case THDL-03 – test-hdl version 1.1	
Case Summary	Check that test-hdl exits if initial count is not zero.
Assertion Tested	STV-AM-14. If the number of each command received for each disk drive is not zero, test-hdl logs the command and disk drive.

Tester	PEB
Test Date	Tue Jul 20 16:15 2004
Test Hardware	Machine: Max Disk drives: 91 AA
Test Software	Windows 98 [Version 4.10.2222] tally13 1.1 vtact 1.3
Command(s) Executed	tally13 vtact dir c:
Log File Highlights	Monitor BIOS interrupt 13h (disk service) tally13 compiled on 07/29/03 at 07:33:17 @(#) Version 1.1 Created 07/29/03 at 07:28:05 Now (07/20/04 at 16:15:36) Going . . . TSR CMD: A:\VTACT.EXE Version: @(#) VTACT.CPP Version 1.3 Created 07/20/04 at 10:21:28 @(#) WB-DEFS.H Version 1.2 Created 07/20/04 at 10:21:28 Compiled on Jul 20 2004 at 11:34:58 Identifying code for tally13 was returned Volume in drive C is WIN98-SAFE Directory of C:\ COMMAND COM 93,890 04-23-99 10:22p AUTOEXEC BAT 307 07-20-04 10:01a TEST-HDL EXE 62,423 08-31-03 8:10a DRIVERS <DIR> 11-07-01 11:41p CONFIG SYS 360 04-16-02 3:17p TALLY13 COM 3,032 07-29-03 7:33a SIG-LOG EXE 59,369 10-30-03 9:35a VTPASS EXE 44,447 07-20-04 11:34a VTACT EXE 44,923 07-20-04 11:34a THDL-02 BAT 4,188 07-20-04 4:11p LOG TXT 1,467 07-20-04 4:15p ion 1 1 842,676,016 09-00-28 6:25a 8:05 No w (<DIR> 01-22-09 6:09a :21:28 541,601,363 01-13-14 8:18a Version 1 544,497,952 09-16-03 6:17a for tall y13 1,982,807,072 00-13-85 12:35p ction>" " 1,867,915,274 09-00-86 4:17a -20-04 1 0:0 <DIR> 02-05-24 4:02a 62,42 3 <DIR> 09-16-28 6:09a 360 04- 16- <DIR> 02-12-18 8:10a a SIG-L OG 824,188,985 01-25-02 6:41a 44,4 47 1,096,046,090 01-19-06 7:17a CT EX E 808,267,826 01-00-04 4:01a TXT 825,898,016 01-13-04 6:01a 5p ion 1 538,981,937 01-23-07 6:49a <DIR> 842,664,461 01-26-04 6:49a 1:28 758,329,645 01-00-96 6:25a <DIR> 537,529,697 01-20-09 4:01a 62,42 3 909,192,505 01-00-96 4:01a .02- <DIR> 08-10-28 1:43a 01-19- 06 538,976,325 09-00-14 4:01a
Command(s) Executed	test-hdl
Log File Highlights	CMD: A:\TEST-HDL.EXE THDL-03 Max PEB r 91 AA Case: THDL-03

```
Command set: Read
Date: Tue Jul 20 16:16:00 2004

Version:  @(#)  test-hdl.cpp  Version  1.1  Created  08/23/03  at
10:13:51
          @(#) wb-defs.h Version 1.2 Created 08/31/03 at 08:18:19
                            Compiled on Aug 31 2003 at 08:10:54
Operator: PEB
Host: Max
Number of drives 2, Drives: 91 AA
Warning: non-zero tally (6) for drive 80 (reboot to clear)
     Case  Cmd Drv Action  Stat Cry Count Cmd Name
  0 THDL-03 <02> 80 Allowed 0000 Off     7  ReadSectors
  1 THDL-03 <0A> 80 Allowed 0000 Off     1  ReadLong
  2 THDL-03 <42> 80 Allowed 0000 Off     1  ExtRead
Results for THDL-03 category r on drive 80 No commands blocked (0
of 3)
  0 THDL-03 <02> 81 Allowed 0000 Off     1  ReadSectors
  1 THDL-03 <0A> 81 Allowed 0000 Off     1  ReadLong
  2 THDL-03 <42> 81 Allowed 0000 Off     1  ExtRead
Results for THDL-03 category r on drive 81 No commands blocked (0
of 3)
Summary: 6 sent, 0 blocked, 6 not blocked


Number of Commands not blocked (should total to 12)
Drive  Count
  80       9
  81       3
```

Results

Assertion	Expected Results	Actual Results
AM-14	Test-hdl exits.	Test-hdl issues a warning, but does not exit.

Case THDL-04 – test-hdl version 1.1	
Case Summary	Check that test-hdl logs command line and disk drives, that it commands tally13 to active mode, sends specified commands, logs each command sent and commands blocked, and summarizes blocking.

Assertions Tested	STV-AM-10. When executed, test-hdl logs the following information: command line, including any command line options, test case ID, command category to be tested, operator ID (initials or name), and name of the computer on which the program is executed. STV-AM-11. When executed, test-hdl writes the following information to a log file: the number of installed disk drives and the external labels of each disk drive. STV-AM-13. Test-hdl commands tally13 to active mode. STV-AM-15. Test-hdl sends each interrupt 0x13 command in the specified category to each disk drive. STV-AM-16. For each command sent, test-hdl logs the command code, disk drive issued to, return count, status register value, and carry flag setting. STV-AM-17. Test-hdl logs how many of each command is sent and how many of each command is blocked for each disk drive. STV-AM-18. Test-hdl logs that all, not all or no commands were blocked for each disk drive.
Tester	PEB
Test Date	Wed Jul 21 14:34 2004
Test Hardware	Machine: Max Disk drives: 91 AA
Test Software	Windows 98 [Version 4.10.2222] tally13 1.1 vtreport 1.3
Setup	`tally13`
Command(s) Executed	`test-hdl THDL-04 Max PEB w 91 AA`

Log File Highlights	`CMD: A:\TEST-HDL.EXE THDL-04 Max PEB w 91 AA`
	`Case: THDL-04`
	`Command set: Write`
	`Date: Wed Jul 21 14:34:27 2004`
	
	`Version: @(#) test-hdl.cpp Version 1.1 Created 08/23/03 at 10:13:51`
	`@(#) wb-defs.h Version 1.2 Created 08/31/03 at 08:18:19`
	`Compiled on Aug 31 2003 at 08:10:54`
	`Operator: PEB`
	`Host: Max`
	`Number of drives 2, Drives: 91 AA`
	`Case Cmd Drv Action Stat Cry Count Cmd Name`
	`0 THDL-04 <03> 80 Allowed 0000 Off 1 WriteSectors`
	`1 THDL-04 <0B> 80 Allowed 0000 Off 1 WriteLong`
	`2 THDL-04 <43> 80 Allowed 0000 Off 1 ExtWrite`
	`Results for THDL-04 category w on drive 80 No commands blocked (0 of 3)`
	`0 THDL-04 <03> 81 Allowed 0000 Off 1 WriteSectors`
	`1 THDL-04 <0B> 81 Allowed 0000 Off 1 WriteLong`
	`2 THDL-04 <43> 81 Allowed 0000 Off 1 ExtWrite`
	`Results for THDL-04 category w on drive 81 No commands blocked (0 of 3)`
	`Summary: 6 sent, 0 blocked, 6 not blocked`

	Number of Commands not blocked (should total to 6)
	Drive Count
	  80 3
	  81 3

Command(s) Executed	dir a: dir c:

Log File Highlights	Volume in drive C is WIN98-SAFE
	 Volume Serial Number is 5411-4A8E
	 Directory of C:\
	
	COMMAND COM 93,890 04-23-99 10:22p
	AUTOEXEC BAT 307 07-20-04 10:01a
	TEST-HDL EXE 62,423 08-31-03 8:10a
	DRIVERS <DIR> 11-07-01 11:41p
	CONFIG SYS 360 04-16-02 3:17p
	TALLY13 COM 3,032 07-29-03 7:33a
	SIG-LOG EXE 59,369 10-30-03 9:35a
	VTPASS EXE 44,447 07-20-04 11:34a
	VTACT EXE 44,923 07-20-04 11:34a
	THDL-02 BAT 4,215 07-21-04 12:55p
	LOG TXT 2,530 07-21-04 2:34p
	5411-4A8 E
	   168,626,701 09-00-13 12:51p
	DL EXE 538,981,168 09-13-05 7:01a
	   11-07 -01 1,398,362,912 10-09-15 8:50a
	29-03 7 :33 538,976,288 10-24-14 8:41a
	  59,369 1 <DIR> 11-01-86 6:41a
	S EXE 540,291,117 09-23-02 6:01a
	5411-4A8 E
	   168,626,701 09-00-13 12:51p
	DL EXE 538,981,168 09-13-05 7:01a
	   11-07 -01 1,398,362,912 10-09-15 8:50a
	29-03 7 :33 538,976,288 10-24-14 8:41a
	  59,369 1 <DIR> 11-01-86 6:41a
	S EXE 540,291,117 09-23-02 6:01a
	8,626,70 1 <DIR> 01-17-36 6:41a
	  7:01a
	
	     741,488,179 09-19-08 5:33a
	912 10- 09- <DIR> 01-13-04 7:09a
	a
	  59, 369 824,188,960 01-00-96 4:01a
	40,291,1 17 825,505,034 09-16-04 7:17a
	1-4A8 E
	
	     825,045,040 01-00-04 4:01a

Command(s) Executed	vtreport

Log File Highlights	CMD: A:\VTREPORT.EXE
	Version: @(#) VTREPORT.CPP Version 1.3 Created 07/20/04 at 10:21:28
	Compiled on Jul 20 2004 at 11:34:23
	Drive 0 (80)
	Command 0 1 2 3 4 5 6 7 8 9 a b c d e f 0 1 2 3 4 5 6 7 8 9 a b c d e f
	     00 0 0 6 1 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	     20 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	     40 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	     60 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	     80 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	     a0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	     c0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

```
     e0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
Drive 1 (81)
Command 0 1 2 3 4 5 6 7 8 9 a b c d e f 0 1 2 3 4 5 6 7 8 9 a b c
d e f
     00 0 0 0 1 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
     20 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
     40 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
     60 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
     80 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
     a0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
     c0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
     e0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
Drive 2 (82)
Command 0 1 2 3 4 5 6 7 8 9 a b c d e f 0 1 2 3 4 5 6 7 8 9 a b c
d e f
     00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
     20 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
     40 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
     60 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
     80 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
     a0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
     c0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
     e0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
Drive 3 (83)
Command 0 1 2 3 4 5 6 7 8 9 a b c d e f 0 1 2 3 4 5 6 7 8 9 a b c
d e f
     00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
     20 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
     40 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
     60 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
     80 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
     a0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
     c0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
     e0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
Drive 4 (84)
Command 0 1 2 3 4 5 6 7 8 9 a b c d e f 0 1 2 3 4 5 6 7 8 9 a b c
d e f
     00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
     20 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
     40 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
     60 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0
     80 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
```

<table>
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a0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
c0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
e0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0</td></tr>
<tr><td>Results</td><td>
<table>
<tr><th>Assertion</th><th>Expected Results</th><th>Actual Results</th></tr>
<tr><td>AM-10</td><td>Logs command line.</td><td>Logs command line.</td></tr>
<tr><td>AM-11</td><td>Logs disk drive info.</td><td>Logs disk drive info.</td></tr>
<tr><td>AM-16</td><td>Logs each command sent.</td><td>Logs each command sent.</td></tr>
<tr><td>AM-17</td><td>Logs commands blocked.</td><td>Logs commands blocked.</td></tr>
<tr><td>AM-18</td><td>Summarizes blocking.</td><td>Summarizes blocking.</td></tr>
<tr><td>AM-13</td><td>Tally13 is activated.</td><td>Tally13 is activated.</td></tr>
<tr><td>AM-15</td><td>Sends specified commands.</td><td>Sends specified commands.</td></tr>
</table>
</td></tr>
</table>

Case THDL-05 – test-hdl version 1.1	
Case Summary	Check that test-hdl sends specified commands, logs each command sent and commands blocked, summarizes blocking, and logs commands received, but not sent.
Assertions Tested	STV-AM-15. Test-hdl sends each interrupt 0x13 command in the specified category to each disk drive. STV-AM-16. For each command sent, test-hdl logs the command code, disk drive issued to, return count, status register value, and carry flag setting. STV-AM-17. Test-hdl logs how many of each command is sent and how many of each command is blocked for each disk drive. STV-AM-18. Test-hdl logs that all, not all or no commands were blocked for each disk drive. STV-AM-19. Test-hdl logs if any commands were received, but not sent.
Tester	PEB
Test Date	Wed Jul 21 14:50 2004
Test Hardware	Machine: Max Disk drives: 91 AA
Test Software	Windows 98 [Version 4.10.2222] tally13 1.1 vtblksom 1.2 vtreport 1.3
Setup	`tally13` `vtblksom`
Command(s) Executed	`test-hdl THDL-05 Max PEB a 91 AA`

Log File Highlights	`CMD: A:\TEST-HDL.EXE THDL-05 Max PEB a 91 AA`
	`Case: THDL-05`
	`Command set: All`
	`Date: Wed Jul 21 14:50:51 2004`
	
	`Version: @(#) test-hdl.cpp Version 1.1 Created 08/23/03 at`

```
10:13:51
          @(#) wb-defs.h Version 1.2 Created 08/31/03 at 08:18:19
                              Compiled on Aug 31 2003 at 08:10:54
Operator: PEB
Host: Max
Number of drives 2, Drives: 91 AA
     Case  Cmd Drv Action  Stat Cry Count Cmd Name
  0 THDL-05 <00> 80 Allowed 0000 Off     1  Reset
  1 THDL-05 <0C> 80 Allowed 0000 Off     1  SeekDrive
  2 THDL-05 <0D> 80 Allowed 0000 Off     1  AltReset
  3 THDL-05 <11> 80 Allowed 0000 Off     1  Recalibrate
  4 THDL-05 <47> 80 Blocked 0000 Off     0  ExtendedSeek
Results for THDL-05 category c on drive 80 Not all commands
blocked (1 of 5)
  0 THDL-05 <00> 81 Allowed 0000 Off     1  Reset
  1 THDL-05 <0C> 81 Allowed 0000 Off     1  SeekDrive
  2 THDL-05 <0D> 81 Allowed 0000 Off     1  AltReset
  3 THDL-05 <11> 81 Allowed 0000 Off     1  Recalibrate
  4 THDL-05 <47> 81 Blocked 0000 Off     0  ExtendedSeek
Results for THDL-05 category c on drive 81 Not all commands
blocked (1 of 5)
Summary: 10 sent, 2 blocked, 8 not blocked

  0 THDL-05 <01> 80 Allowed 0000 Off     1  GetLastStatus
  1 THDL-05 <04> 80 Allowed 0000 Off     1  VerifySectors
  2 THDL-05 <08> 80 Allowed 0000 Off     1  ReadDriveParms
  3 THDL-05 <10> 80 Allowed 0000 Off     1  TestDriveReady
  4 THDL-05 <15> 80 Allowed 0000 Off     1  ReadDriveType
  5 THDL-05 <41> 80 Blocked 0000 Off     0  CheckForExtensions
  6 THDL-05 <44> 80 Blocked 0000 Off     0  VerifySectors
  7 THDL-05 <48> 80 Blocked 0000 Off     0  GetDriveParms
Results for THDL-05 category i on drive 80 Not all commands
blocked (3 of 8)
  0 THDL-05 <01> 81 Allowed 0000 Off     1  GetLastStatus
  1 THDL-05 <04> 81 Allowed 0000 Off     1  VerifySectors
  2 THDL-05 <08> 81 Allowed 0000 Off     1  ReadDriveParms
  3 THDL-05 <10> 81 Allowed 0000 Off     1  TestDriveReady
  4 THDL-05 <15> 81 Allowed 0000 Off     1  ReadDriveType
  5 THDL-05 <41> 81 Blocked 0000 Off     0  CheckForExtensions
  6 THDL-05 <44> 81 Blocked 0000 Off     0  VerifySectors
  7 THDL-05 <48> 81 Blocked 0000 Off     0  GetDriveParms
Results for THDL-05 category i on drive 81 Not all commands
blocked (3 of 8)
Summary: 16 sent, 6 blocked, 10 not blocked

  0 THDL-05 <02> 80 Allowed 0000 Off     1  ReadSectors
  1 THDL-05 <0A> 80 Allowed 0000 Off     1  ReadLong
  2 THDL-05 <42> 80 Blocked 0000 Off     0  ExtRead
Results for THDL-05 category r on drive 80 Not all commands
blocked (1 of 3)
  0 THDL-05 <02> 81 Allowed 0000 Off     1  ReadSectors
  1 THDL-05 <0A> 81 Allowed 0000 Off     1  ReadLong
  2 THDL-05 <42> 81 Blocked 0000 Off     0  ExtRead
Results for THDL-05 category r on drive 81 Not all commands
blocked (1 of 3)
Summary: 6 sent, 2 blocked, 4 not blocked

  0 THDL-05 <03> 80 Allowed 0000 Off     1  WriteSectors
  1 THDL-05 <0B> 80 Allowed 0000 Off     1  WriteLong
  2 THDL-05 <43> 80 Blocked 0000 Off     0  ExtWrite
Results for THDL-05 category w on drive 80 Not all commands
blocked (1 of 3)
  0 THDL-05 <03> 81 Allowed 0000 Off     1  WriteSectors
  1 THDL-05 <0B> 81 Allowed 0000 Off     1  WriteLong
  2 THDL-05 <43> 81 Blocked 0000 Off     0  ExtWrite
Results for THDL-05 category w on drive 81 Not all commands
blocked (1 of 3)
Summary: 6 sent, 2 blocked, 4 not blocked

  0 THDL-05 <05> 80 Allowed 0000 Off     1  FormatTrack
  1 THDL-05 <06> 80 Allowed 0000 Off     1  FormatBadSectors
```

	2 THDL-05 <07> 80 Allowed 0000 Off 1 FormatCyl 3 THDL-05 <09> 80 Allowed 0000 Off 1 InitDriveParms 4 THDL-05 <0E> 80 Allowed 0000 Off 1 DiagnosticESDI 5 THDL-05 <0F> 80 Allowed 0000 Off 1 DiagnosticESDI 6 THDL-05 <12> 80 Allowed 0000 Off 1 DiagnosticRAM 7 THDL-05 <13> 80 Allowed 0000 Off 1 DiagnosticDrive 8 THDL-05 <14> 80 Allowed 0000 Off 1 DiagnosticCTL Results for THDL-05 category x on drive 80 No commands blocked (0 of 9) 0 THDL-05 <05> 81 Allowed 0000 Off 1 FormatTrack 1 THDL-05 <06> 81 Allowed 0000 Off 1 FormatBadSectors 2 THDL-05 <07> 81 Allowed 0000 Off 1 FormatCyl 3 THDL-05 <09> 81 Allowed 0000 Off 1 InitDriveParms 4 THDL-05 <0E> 81 Allowed 0000 Off 1 DiagnosticESDI 5 THDL-05 <0F> 81 Allowed 0000 Off 1 DiagnosticESDI 6 THDL-05 <12> 81 Allowed 0000 Off 1 DiagnosticRAM 7 THDL-05 <13> 81 Allowed 0000 Off 1 DiagnosticDrive 8 THDL-05 <14> 81 Allowed 0000 Off 1 DiagnosticCTL Results for THDL-05 category x on drive 81 No commands blocked (0 of 9) Summary: 18 sent, 0 blocked, 18 not blocked 0 THDL-05 <16> 81 Allowed 0000 Off 1 Undefined *(commands <17> through <3F> reported allowed)* 42 THDL-05 <40> 81 Allowed 0000 Off 1 Undefined 43 THDL-05 <45> 81 Blocked 0000 Off 0 Undefined *(commands <46> through <7F> reported blocked)* 100 THDL-05 <80> 81 Blocked 0000 Off 0 Undefined 101 THDL-05 <81> 81 Allowed 0000 Off 1 Undefined 102 THDL-05 <82> 81 Blocked 0000 Off 0 Undefined *(commands <83> through <FE> reported blocked)* 227 THDL-05 <FF> 81 Blocked 0000 Off 0 Undefined Results for THDL-05 category m on drive 80 Not all commands blocked (184 of 228) 0 THDL-05 <16> 81 Allowed 0000 Off 1 Undefined *(commands <17> through <3F> reported allowed)* 42 THDL-05 <40> 81 Allowed 0000 Off 1 Undefined 43 THDL-05 <45> 81 Blocked 0000 Off 0 Undefined *(commands <46> through <7F> reported blocked)* 100 THDL-05 <80> 81 Blocked 0000 Off 0 Undefined 101 THDL-05 <81> 81 Allowed 0000 Off 1 Undefined 102 THDL-05 <82> 81 Blocked 0000 Off 0 Undefined *(commands <83> through <FE> reported blocked)* 227 THDL-05 <FF> 81 Blocked 0000 Off 0 Undefined Results for THDL-05 category m on drive 81 Not all commands blocked (184 of 228) Summary: 456 sent, 368 blocked, 88 not blocked Number of Commands not blocked (should total to 132) Drive Count 80 66 81 66
Command(s) Executed	vtreport
Log File Highlights	CMD: A:\VTREPORT.EXE Version: @(#) VTREPORT.CPP Version 1.3 Created 07/20/04 at 10:21:28 Compiled on Jul 20 2004 at 11:34:23 Drive 0 (80) Command 0 1 2 3 4 5 6 7 8 9 a b c d e f 0 1 2 3 4 5 6 7 8 9 a b c d e f 00 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 20 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 40 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 60 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

```
     80 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
     a0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
     c0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
     e0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Drive 1 (81)
Command 0 1 2 3 4 5 6 7 8 9 a b c d e f 0 1 2 3 4 5 6 7 8 9 a b c
d e f
     00 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
     20 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
     40 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
     60 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
     80 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
     a0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
     c0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
     e0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
```

Results

Assertion	Expected Results	Actual Results
AM-16	Logs each command sent.	Logs each command sent.
AM-17	Logs commands blocked.	Logs command as allowed when received, but not sent.
AM-18	Summarizes blocking.	Summarizes blocking.
AM-19	Logs unsent commands received.	Does not log unsent commands received
AM-15	Sends specified commands.	Sends specified commands.

Case THDL-06 – test-hdl version 1.1	
Case Summary	Check that test-hdl logs commands blocked and summarizes blocking.
Assertions Tested	STV-AM-17. Test-hdl logs how many of each command is sent and how many of each command is blocked for each disk drive. STV-AM-18. Test-hdl logs that all, not all or no commands were blocked for each disk drive.
Tester	PEB
Test Date	Wed Jul 21 14:57 2004
Test Hardware	Machine: Max Disk drives: 91 AA
Test Software	Windows 98 [Version 4.10.2222] tally13 1.1 vtblock 1.2
Setup	`tally13` `vtblock`

Command(s) Executed	test-hdl THDL-06 Max PEB a 91 AA
Log File Highlights	CMD: A:\TEST-HDL.EXE THDL-06 Max PEB a 91 AA Case: THDL-06 Command set: All Date: Wed Jul 21 14:57:06 2004 Version: @(#) test-hdl.cpp Version 1.1 Created 08/23/03 at 10:13:51 @(#) wb-defs.h Version 1.2 Created 08/31/03 at 08:18:19 Compiled on Aug 31 2003 at 08:10:54 Operator: PEB Host: Max Number of drives 2, Drives: 91 AA Case Cmd Drv Action Stat Cry Count Cmd Name 0 THDL-06 <00> 80 Blocked 0000 Off 0 Reset 1 THDL-06 <0C> 80 Blocked 0000 Off 0 SeekDrive 2 THDL-06 <0D> 80 Blocked 0000 Off 0 AltReset 3 THDL-06 <11> 80 Blocked 0000 Off 0 Recalibrate 4 THDL-06 <47> 80 Blocked 0000 Off 0 ExtendedSeek Results for THDL-06 category c on drive 80 All commands blocked (5 of 5) 0 THDL-06 <00> 81 Blocked 0000 Off 0 Reset 1 THDL-06 <0C> 81 Blocked 0000 Off 0 SeekDrive 2 THDL-06 <0D> 81 Blocked 0000 Off 0 AltReset 3 THDL-06 <11> 81 Blocked 0000 Off 0 Recalibrate 4 THDL-06 <47> 81 Blocked 0000 Off 0 ExtendedSeek Results for THDL-06 category c on drive 81 All commands blocked (5 of 5) Summary: 10 sent, 10 blocked, 0 not blocked 0 THDL-06 <01> 80 Blocked 0000 Off 0 GetLastStatus 1 THDL-06 <04> 80 Blocked 0000 Off 0 VerifySectors 2 THDL-06 <08> 80 Blocked 0000 Off 0 ReadDriveParms 3 THDL-06 <10> 80 Blocked 0000 Off 0 TestDriveReady 4 THDL-06 <15> 80 Blocked 0000 Off 0 ReadDriveType 5 THDL-06 <41> 80 Blocked 0000 Off 0 CheckForExtensions 6 THDL-06 <44> 80 Blocked 0000 Off 0 VerifySectors 7 THDL-06 <48> 80 Blocked 0000 Off 0 GetDriveParms Results for THDL-06 category i on drive 80 All commands blocked (8 of 8) 0 THDL-06 <01> 81 Blocked 0000 Off 0 GetLastStatus 1 THDL-06 <04> 81 Blocked 0000 Off 0 VerifySectors 2 THDL-06 <08> 81 Blocked 0000 Off 0 ReadDriveParms 3 THDL-06 <10> 81 Blocked 0000 Off 0 TestDriveReady 4 THDL-06 <15> 81 Blocked 0000 Off 0 ReadDriveType 5 THDL-06 <41> 81 Blocked 0000 Off 0 CheckForExtensions 6 THDL-06 <44> 81 Blocked 0000 Off 0 VerifySectors 7 THDL-06 <48> 81 Blocked 0000 Off 0 GetDriveParms Results for THDL-06 category i on drive 81 All commands blocked (8 of 8) Summary: 16 sent, 16 blocked, 0 not blocked 0 THDL-06 <02> 80 Blocked 0000 Off 0 ReadSectors 1 THDL-06 <0A> 80 Blocked 0000 Off 0 ReadLong 2 THDL-06 <42> 80 Blocked 0000 Off 0 ExtRead Results for THDL-06 category r on drive 80 All commands blocked (3 of 3) 0 THDL-06 <02> 81 Blocked 0000 Off 0 ReadSectors 1 THDL-06 <0A> 81 Blocked 0000 Off 0 ReadLong 2 THDL-06 <42> 81 Blocked 0000 Off 0 ExtRead Results for THDL-06 category r on drive 81 All commands blocked (3 of 3) Summary: 6 sent, 6 blocked, 0 not blocked 0 THDL-06 <03> 80 Blocked 0000 Off 0 WriteSectors 1 THDL-06 <0B> 80 Blocked 0000 Off 0 WriteLong 2 THDL-06 <43> 80 Blocked 0000 Off 0 ExtWrite Results for THDL-06 category w on drive 80 All commands blocked (3 of 3)

```
  0 THDL-06 <03> 81 Blocked 0000 Off     0  WriteSectors
  1 THDL-06 <0B> 81 Blocked 0000 Off     0  WriteLong
  2 THDL-06 <43> 81 Blocked 0000 Off     0  ExtWrite
Results for THDL-06 category w on drive 81 All commands blocked
(3 of 3)
Summary: 6 sent, 6 blocked, 0 not blocked

  0 THDL-06 <05> 80 Blocked 0000 Off     0  FormatTrack
  1 THDL-06 <06> 80 Blocked 0000 Off     0  FormatBadSectors
  2 THDL-06 <07> 80 Blocked 0000 Off     0  FormatCyl
  3 THDL-06 <09> 80 Blocked 0000 Off     0  InitDriveParms
  4 THDL-06 <0E> 80 Blocked 0000 Off     0  DiagnosticESDI
  5 THDL-06 <0F> 80 Blocked 0000 Off     0  DiagnosticESDI
  6 THDL-06 <12> 80 Blocked 0000 Off     0  DiagnosticRAM
  7 THDL-06 <13> 80 Blocked 0000 Off     0  DiagnosticDrive
  8 THDL-06 <14> 80 Blocked 0000 Off     0  DiagnosticCTL
Results for THDL-06 category x on drive 80 All commands blocked
(9 of 9)
  0 THDL-06 <05> 81 Blocked 0000 Off     0  FormatTrack
  1 THDL-06 <06> 81 Blocked 0000 Off     0  FormatBadSectors
  2 THDL-06 <07> 81 Blocked 0000 Off     0  FormatCyl
  3 THDL-06 <09> 81 Blocked 0000 Off     0  InitDriveParms
  4 THDL-06 <0E> 81 Blocked 0000 Off     0  DiagnosticESDI
  5 THDL-06 <0F> 81 Blocked 0000 Off     0  DiagnosticESDI
  6 THDL-06 <12> 81 Blocked 0000 Off     0  DiagnosticRAM
  7 THDL-06 <13> 81 Blocked 0000 Off     0  DiagnosticDrive
  8 THDL-06 <14> 81 Blocked 0000 Off     0  DiagnosticCTL
Results for THDL-06 category x on drive 81 All commands blocked
(9 of 9)
Summary: 18 sent, 18 blocked, 0 not blocked

  0 THDL-06 <16> 80 Blocked 0000 Off     0 Undefined
  (commands <17> through <FE> reported blocked)
227 THDL-06 <FF> 80 Blocked 0000 Off     0 Undefined
Results for THDL-06 category m on drive 80 All commands blocked
(228 of 228)
  0 THDL-06 <16> 81 Blocked 0000 Off     0 Undefined
  (commands <17> through <FE> reported blocked)
227 THDL-06 <FF> 81 Blocked 0000 Off     0 Undefined
Results for THDL-06 category m on drive 81 All commands blocked
(228 of 228)
Summary: 456 sent, 456 blocked, 0 not blocked


Number of Commands not blocked (should total to 0)
Drive  Count
  80       0
  81       0
```

Results

Assertion	Expected Results	Actual Results
AM-17	Logs commands blocked.	Logs command blocked.
AM-18	Summarizes blocking.	Summarizes blocking.

Code Review TOFF-01 – t-off version 1.1	
Case Summary	Review source code for possible errors and conformance to assertions.

<table>
<tr><td>Assertions Reviewed</td><td>STV-AM-20. When executed, t-off logs the following information: program name, file names, version numbers and date and time of creation of each source file, system date and time program execution begins, and date and time compiled.
STV-AM-21. When executed, t-off logs the following information: command line, including any command line options, test case ID, operator ID (initials or name), name of the computer on which the program is executed.
STV-AM-22. If tally13 is not present, t-off issues a message and exits.
STV-AM-23. T-off commands tally13 to passive mode.</td></tr>
<tr><td>Reviewers</td><td>KR, SM, PEB</td></tr>
<tr><td>Review Date</td><td>Wed Jul 7 2004</td></tr>
<tr><td>Review Highlights</td><td>t-off.cpp
Overall
Just copies command line for operator, case, and host
should not cause invalid results

Overall
Does not compile as C++ program on some Linux machines
should not cause invalid results

Line 69 terminates early if passed wrong number of operands
should not cause invalid results

Line 73 lone backslash in string: "A:\OFF-LOG.TXT"
Compiler sees \ as escape character
should not cause invalid results if used properly

Line 73 file opened with write (instead of append)
Erases any existing information
May lose record of previous run
should not cause invalid results

Line 75 format string has %s, but no string (file name) passed
If log file can’t be opened, strange stuff may be displayed or program may crash.
should not cause invalid results</td></tr>
<tr><td>Results</td><td>
<table>
<tr><th>Assertion</th><th>Expected Results</th><th>Actual Results</th></tr>
<tr><td>AM-20</td><td>Should satisfy assertion</td><td>Should satisfy assertion</td></tr>
<tr><td>AM-21</td><td>Should satisfy assertion</td><td>Should satisfy assertion</td></tr>
<tr><td>AM-22</td><td>Should satisfy assertion</td><td>Should satisfy assertion</td></tr>
<tr><td>AM-23</td><td>Should satisfy assertion</td><td>Should satisfy assertion</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th colspan="2">Case TOFF-02 – t-off version 1.1</th></tr>
<tr><td>Case Summary</td><td>Check that t-off reports file information and date and time run and that it issues a message and exits if tally13 is not running.</td></tr>
<tr><td>Assertions Tested</td><td>STV-AM-20. When executed, t-off logs the following information: program name, file names, version numbers and date and time of creation of each source file, system date and time program execution begins, and date and time compiled.
STV-AM-21. When executed, t-off logs the following information: command line, including any command line options, test case ID, operator ID (initials or name), name of the computer on which the program is executed.
STV-AM-22. If tally13 is not present, t-off issues a message and exits.</td></tr>
<tr><td>Tester</td><td>PEB</td></tr>
<tr><td>Test Date</td><td>Fri Jul 23 12:04 2004</td></tr>
<tr><td>Test Hardware</td><td>Machine: Max
Disk drives: 91 AA</td></tr>
<tr><td>Test Software</td><td>Windows 98 [Version 4.10.2222]</td></tr>
<tr><td>Command(s) Executed</td><td><pre>t-off TOFF-02 Max PEB</pre></td></tr>
<tr><td>Log File Highlights</td><td><pre>Test Harness is not active

CMD: A:\T-OFF.EXE TOFF-02 Max PEB
Case: TOFF-02
Date: Fri Jul 23 12:04:04 2004

Version: @(#) t-off.cpp Version 1.1 Created 08/02/03 at 16:24:48
                              Compiled on Aug 2 2003 at 16:14:25
Operator: PEB
Host: Max</pre></td></tr>
<tr><td>Results</td><td>
<table>
<tr><th>Assertion</th><th>Expected Results</th><th>Actual Results</th></tr>
<tr><td>AM-20</td><td>Report file and date information.</td><td>Report file and date information.</td></tr>
<tr><td>AM-21</td><td>Logs command line.</td><td>Logs command line.</td></tr>
<tr><td>AM-22</td><td>Issues message and exits.</td><td>Issues message and exits.</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th colspan="2">Case TOFF-03 – t-off version 1.1</th></tr>
<tr><td>Case Summary</td><td>Check that t-off commands tally13 to passive mode</td></tr>
<tr><td>Assertion Tested</td><td>STV-AM-23. T-off commands tally13 to passive mode.</td></tr>
<tr><td>Tester</td><td>PEB</td></tr>
<tr><td>Test Date</td><td>Fri Jul 23 12:06 2004</td></tr>
<tr><td>Test Hardware</td><td>Machine: Max
Disk drives: 91 AA</td></tr>
<tr><td>Test Software</td><td>Windows 98 [Version 4.10.2222]
tally13 1.1
vtact 1.3</td></tr>
<tr><td>Setup</td><td><pre>tally13
vtact</pre></td></tr>
</table>

Command(s) Executed	`t-off TOFF-03 Max PEB`

Log File Highlights	`CMD: A:\T-OFF.EXE TOFF-03 Max PEB`
	`Case: TOFF-03`
	`Date: Fri Jul 23 12:06:43 2004`
	
	`Version: @(#) t-off.cpp Version 1.1 Created 08/02/03 at 16:24:48`
	`Compiled on Aug 2 2003 at 16:14:25`
	`Operator: PEB`
	`Host: Max`

Command(s) Executed	`dir a:` `dir c:`

Log File Highlights	`Volume in drive C is W98`
	`Volume Serial Number is 3DCC-D91D`
	`Directory of C:\`
	
	`COMMAND COM 93,890 04-23-99 10:22p`
	`WINDOWS <DIR> 11-09-02 11:49a`
	`NETLOG TXT 19,019 11-09-02 11:06p`
	`CONFIG SYS 0 11-09-02 11:07p`
	`AUTOEXEC BAT 0 11-09-02 11:07p`
	`MYDOCU~1 <DIR> 11-09-02 11:10p`
	`PROGRA~1 <DIR> 11-09-02 11:49a`
	`4 file(s) 112,909 bytes`
	`3 dir(s) 2,838,558,720 bytes free`

Results	**Assertion** / **Expected Results** / **Actual Results** AM-23 / Dir command returns expected result / Dir command returns expected result

Code Review SIGL-01 – sig-log version 1.1	
Case Summary	Review source code for possible errors and conformance to assertions.
Assertions Reviewed	STV-AM-24. When executed, sig-log logs the following information: program name, file names, version numbers and date and time of creation of each source file, system date and time program execution begins, and date and time compiled. STV-AM-25. When executed, sig-log logs the following information: command line, including any command line options, test case ID, operator ID (initials or name), name of the computer on which the program is executed. STV-AM-26. Sig-log asks the operator if an audio or visual signal was observed and logs a positive response. STV-AM-27. Sig-log asks the operator if an audio or visual signal was observed and logs a negative response.
Reviewers	KR, SM, PEB
Review Date	Wed Jul 7 2004
Review Highlights	sig-log.cpp Overall Just copies command line for operator, case, and host *should not cause invalid results*

<table>
<tr><td></td><td>Overall
Does not compile as C++ program on some Linux machines
should not cause invalid results

Line 62 terminates early if passed wrong number of operands
should not cause invalid results

Line 66 file opened with write (instead of append)
Erases any existing information
May lose record of previous run
should not cause invalid results

Line 68 format string has %s, but no string (file name) passed
If log file can’t be opened, strange stuff may be displayed or program may crash.
should not cause invalid results

Line 84 grammar: . . . a[n] audio/visual signal . . .
should not cause invalid results

Line 88 uninitialized variable, ans, if user just hits enter
Erroneous finding: ans is initialized on line 82

Line 89 report phrasing could be confusing. Instead of
<code>SIGNAL: y</code> (or n)
better is
Operator reported observing a signal
or
Operator reported no signal was observed
should not cause invalid results</td></tr>
<tr><td>Results</td><td>
<table>
<tr><th>Assertion</th><th>Expected Results</th><th>Actual Results</th></tr>
<tr><td>AM-24</td><td>Should satisfy assertion</td><td>Should satisfy assertion</td></tr>
<tr><td>AM-25</td><td>Should satisfy assertion</td><td>Should satisfy assertion</td></tr>
<tr><td>AM-26</td><td>Should satisfy assertion</td><td>Should satisfy assertion</td></tr>
<tr><td>AM-27</td><td>Should satisfy assertion</td><td>Should satisfy assertion</td></tr>
</table>
</td></tr>
</table>

Case SIGL-02 – sig-log version 1.1	
Case Summary	Check that sig-log logs file information and date and time run. Check that sig-log logs when the operator reports a signal

<table>
<tr><td>Assertions Tested</td><td>STV-AM-24. When executed, sig-log logs the following information: program name, file names, version numbers and date and time of creation of each source file, system date and time program execution begins, and date and time compiled.
STV-AM-25. When executed, sig-log logs the following information: command line, including any command line options, test case ID, operator ID (initials or name), name of the computer on which the program is executed.
STV-AM-26. Sig-log asks the operator if an audio or visual signal was observed and logs a positive response.</td></tr>
<tr><td>Tester</td><td>PEB</td></tr>
<tr><td>Test Date</td><td>Tue Oct 26 9:52 2004</td></tr>
<tr><td>Test Hardware</td><td>Machine: Max
Disk drives: 6F</td></tr>
<tr><td>Test Software</td><td>Windows 98 [Version 4.10.2222]</td></tr>
<tr><td>Command(s) Executed</td><td><pre>sig-log SIGL-02 Max PEB</pre></td></tr>
<tr><td>Log File Highlights</td><td><pre>Was a audio/visual signal observed [y|n]?
CMD: A:\SIG-LOG.EXE SIGL-02 Max PEB
Case: SIGL-02
Date: Tue Oct 26 09:52:20 2004

Version: @(#) sig-log.cpp Version 1.1 Created 10/30/03 at 10:17:12
                          Compiled on Oct 30 2003 at 09:35:36
Operator: PEB
Host: Max

SIGNAL: y</pre></td></tr>
<tr><td>Results</td><td>
<table>
<tr><th>Assertion</th><th>Expected Results</th><th>Actual Results</th></tr>
<tr><td>AM-24</td><td>Reports program name, file information, and system time.</td><td>Reports file information and system time.</td></tr>
<tr><td>AM-25</td><td>Logs command line.</td><td>Logs command line.</td></tr>
<tr><td>AM-26</td><td>Logs that a signal was observed.</td><td>Logs that a signal was observed.</td></tr>
</table>
</td></tr>
</table>

Case SIGL-03 – sig-log version 1.1	
Case Summary	Check that sig-log logs when the operator reports no signal.
Assertion Tested	STV-AM-27. Sig-log asks the operator if an audio or visual signal was observed and logs a negative response.
Tester	PEB
Test Date	Tue Oct 26 9:53 2004
Test Hardware	Machine: Max Disk drives: 6F
Test Software	Windows 98 [Version 4.10.2222]
Command(s) Executed	`sig-log SIGL-03 Max PEB`

Log File Highlights	`Was a audio/visual signal observed [y|n]?`
	`CMD: A:\SIG-LOG.EXE SIGL-03 Max PEB`
	`Case: SIGL-03`

<table>
<tr><td></td><td>
<pre>
Date: Tue Oct 26 09:54:14 2004

Version: @(#) sig-log.cpp Version 1.1 Created 10/30/03 at 10:17:12
                                Compiled on Oct 30 2003 at 09:35:36
Operator: PEB
Host: Max

SIGNAL: n
</pre>
</td></tr>
<tr><td>Results</td><td>
<table>
<tr><th>Assertion</th><th>Expected Results</th><th>Actual Results</th></tr>
<tr><td>AM-27</td><td>Logs that no signal was observed.</td><td>Logs that no signal was observed.</td></tr>
</table>
</td></tr>
</table>