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Finger Print Scanner Functional Test Specification

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Abstract

This test specification defines a set of tests to verify the functionality of the 1394 interface for a Finger Print Scanner.

Keywords

IEEE 1394, Finger Print, Scanner

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Editor, 1394 Trade Association
23117 39th Ave SE
Bothell, WA 98021
USA

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23117 39th Ave SE
Bothell, WA 98021 USA

Contents

Figures

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The source documents are:

IEEE Std 1394-1995, Standard for a High Performance Serial Bus

IEEE Std 1394a-2000, Standard for a High Performance Serial Bus – Amendment 1

IEEE Std 1394b-2002, Standard for a High Performance Serial Bus – Amendment 2

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Foreword (This foreword is not part of 1394 Trade Association Specification 2012001)

This specification was accepted by the Board of Directors of the 1394 Trade Association. Board of Directors acceptance of this specification does not necessarily imply that all board members voted for acceptance. At the time it accepted this specification, the 1394 Trade Association. Board of Directors had the following members:

Max Bassler, Chair
Morten Lave, Vice-Chair
Dave Thompson, Secretary

Organization Represented	*Name of Representative*
Littelfuse	Max Bassler
IPRA	Richard Davies
Texas Instruments	Toni Ray
LSI	Dave Thompson
TC Applied Technologies	Morten Lave
DAP Technology	Richard Mourn

The Compliance & Interoperability Working Group, which developed and reviewed this specification, had the following members:

Richard Mourn, Chair

Max Bassler
Toni Ray
Richard Davies
Dave Thompson
Morten Lave

Revision history

Revision 0.1 (July 11, 2012)

Initial Revision

Revision 0.2 (July 25, 2012)

Change Figures 1 and 2 with new finger print scanner pictures.

Revision 0.3 (August 9, 2012)

Changed second revision number in Revision History from 0.1 to 0.2, Added Linux to list in section 5.3, a few other grammar changes.

Finger Print Scanner Functional Test Specification

1 Scope and purpose

1.1 Scope

This test specification defines a set of tests to verify the “functionality” of the IEEE-1394 interface of a Finger Print Scanner through both functional and interoperability tests.

1.2 Purpose

To define a set of tests that when executed will verify a Finger Print Scanner has correctly functions as IEEE-1394 device.

1.3 Evaluation of results

The test procedures defined in this document result in a Yes or No answer to a question. Unless specified otherwise all results should be evaluated as:

Yes = Pass

No = Fail

If any test fails then the device fails to earn a compliance logo. Please note the tests defined in this document require several components (OS, PC, other devices) that are beyond the control of the test operator. Therefore the test operator must use their judgment when determining fault.

Determine of ‘successfully’ – Unless specifically specified within the test specification, successfully means the test(s) completed with no errors reported by the application or operating system.

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2 Normative references

2.1 Reference scope

The specifications and standards named in this section contain provisions, which, through reference in this text, constitute provisions of this 1394 Trade Association Specification. At the time of publication, the editions indicated were valid. All specifications and standards are subject to revision; parties to agreements based on this 1394 Trade Association Specification are encouraged to investigate the possibility of applying the most recent editions of the specifications and standards indicated below.

2.2 Approved references

The following approved specifications and standards may be obtained from the organizations that control them.

IEEE Std 1394-1995, Standard for a High Performance Serial Bus

IEEE Std 1394a-2000, Standard for a High Performance Serial Bus—Amendment 1

IEEE Std 1394b-2002, Standard for a High Performance Serial Bus—Amendment 2

IEEE Std 1394-2008, Standard for a High Performance Serial Bus

Throughout this document, the term “IEEE 1394" shall be understood to refer to IEEE Std 1394-1995 as amended by IEEE Std 1394a-2000 and IEEE Std 1394b-2002.

2.3 References under development

At the time of publication, the following referenced specifications and standards were under development.

2.4 Reference acquisition

The references cited may be obtained from the organizations that control them:

1394 Trade Association, 23117 39th Ave S, Bothell, WA 98021, USA; (425) 870-6574 / (425) 320-3897 (FAX); http://www.1394ta.org/

American National Standards Institute (ANSI), 11 West 42nd Street, New York, NY 10036, USA; (212) 642-4900 / (212) 398-0023 (FAX); http://www.ansi.org/

Institute of Electrical and Electronic Engineers (IEEE), 445 Hoes Lane, PO Box 1331, Piscataway, NJ 08855-1331, USA; (732) 981-0060 / (732) 981-1721 (FAX); http://www.ieee.org/

In addition, many of the documents controlled by the above organizations may also be ordered through a third party:

Global Engineering Documents, 15 Inverness Way, Englewood, CO 80112-5776; (800) 624-3974 / (303) 792-2192; http://www.global.ihs.com/

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3 Definitions and notation

3.1 Definitions

3.1.1 Conformance

Several keywords are used to differentiate levels of requirements and optionality, as follows:

3.1.1.1 expected: A keyword used to describe the behavior of the hardware or software in the design models assumed by this specification. Other hardware and software design models may also be implemented.

3.1.1.2 ignored: A keyword that describes bits, bytes, quadlets, octlets or fields whose values are not checked by the recipient.

3.1.1.3 may: A keyword that indicates flexibility of choice with no implied preference.

3.1.1.4 reserved: A keyword used to describe objects (bits, bytes, quadlets, octlets and fields) or the code values assigned to these objects in cases where either the object or the code value is set aside for future standardization. Usage and interpretation may be specified by future extensions to this or other specifications. A reserved object shall be zeroed or, upon development of a future specification, set to a value specified by such a specification. The recipient of a reserved object shall ignore its value. The recipient of an object defined by this specification as other than reserved shall inspect its value and reject reserved code values.

3.1.1.5 shall: A keyword that indicates a mandatory requirement. Designers are required to implement all such mandatory requirements to assure interoperability with other products conforming to this specification.

3.1.1.6 should: A keyword that denotes flexibility of choice with a strongly preferred alternative. Equivalent to the phrase “is recommended.”

3.1.2 Glossary

The following terms are used in this specification:

3.1.3 Abbreviations

The following are abbreviations that are used in this specification:

CSR Control and status register [B1]

As exemplified by CSR, abbreviations may cite a bibliographic reference.

3.2 Notation

3.2.1 Numeric values

Decimal and hexadecimal are used within this specification. By editorial convention, decimal numbers are most frequently used to represent quantities or counts. Addresses are uniformly represented by hexadecimal numbers. Hexadecimal numbers are also used when the value represented has an underlying structure that is more apparent in a hexadecimal format than in a decimal format.

Decimal numbers are represented by Arabic numerals without subscripts or by their English names. Hexadecimal numbers are represented by digits from the character set 0 – 9 and A – F followed by the subscript 16. When the subscript is unnecessary to disambiguate the base of the number it may be omitted. For the sake of legibility hexadecimal numbers are separated into groups of four digits separated by spaces.

As an example, 42 and $2A_{16}$ both represent the same numeric value.

4 Finger Print Scanner Test Overview (informative)

4.1 Overview

The Finger Print Scanner Functional Test Specification specifies a set of test that when executed should determine if a Finger Print Scanner correctly functions as a 1394 device. These tests assume a certain level of IEEE-1394 functionality and rely on the execution of other tests such as the Base 1394 Test Suite Definition with Extension for 1394b and IEEE-1394-2008 to verify this functionality. The tests specified in this document focus specifically on the Finger Print Scanner functionality.

4.2 Test Setup and Topologies

Required functionality and interoperability test require different test setups and topologies. Please consult each test for the specific test setup and topology requirements.

5 Point-to-Point Test

5.1 Purpose

The purpose of this test is to check whether the performance between the Device Under Test (DUT) and the reference device is according to expectation when a DUT and a reference device are connected.

- In the case where the devices should be recognized in a certain combination, can the device be recognized?
- Can an image be read from the DUT?
- Are there no issues when 1394 bus resets are initiated during image transfer?

5.2 Determination of reference devices

This section defines how to determine a reference device for DUT. For this test two reference devices are required. For the tests described in this section the reference device will be associated with a computer (PC) running the appropriate operating systems and drivers.

Policy regarding the way to determine reference devices.

1. List the categories of devices that can attach to the DUT (Discover by operating systems).

Example List:

- CH1 – Computer Host on host adapter
- CH2 – Computer Host on motherboard

2. Select two reference devices:

   Select devices from CH category according to the following order of priority:
   a) Select the devices with 1394TA compliance logo from other companies.
   b) Select the devices from other companies that are (were) available on the market.
   c) Select the devices with 1394TA compliance logo from tester's (manufacture of DUT) company.
   d) Select the devices from tester's (manufacture of DUT) company that are (were) available on the market.

5.2.1 IEEE-1394B (Beta) reference devices

At least one of the reference devices shall be a bilingual IEEE-1394b device.

5.3 Platform and Operating System

If the DUT advertises operation under multiple platforms/operating systems one of each platform/operating system should be tested.

Example:

- Windows PC with Windows XP
- Windows PC with Win7
- Mac PC
- Linux

5.4 Common Tests

Common tests shall be executed regardless of the type of the DUT.

5.4.1 Common Tests Topology

For the tests listed in this section the following topology shall be used. Each test listed in this section shall be tested two times, once for each reference device.

DUT ------ Reference Device ------ Bus Reset Generator Node

or

Reference Device ------ DUT ------ Bus Reset Generator Node

Fort test requiring generation of bus reset if both the DUT and Reference device are single port devices then the following topology may be used.

DUT ------ Bus Reset Generator Node ------ Reference Device

5.4.2 Point-to-Point Common Test

If manufacture specific drivers or software is required please follow the manufactures installation instructions prior to executing the following tests.

Test ID	Test Description	Test Result
PP421	Connect DUT to Reference Device. Was DUT correctly listed in Reference Device's device manager/registry?	Yes or No
PP422	Could the DUT be unplugged and correctly removed from device manager/registry	Yes or No
PP423	Repeat steps PP421 and PP422 four times. Was DUT correctly registered/unregistered each time?	Yes or No
PP424	**Windows specific test:** After connection of DUT, disable DUT's driver through device manager. Was DUT correctly disabled?	Yes or No
PP425	**Windows specific test:** Enable DUT's driver through Device Manager. Was DUT correctly enabled or reactivated?	Yes or No
PP426	**Windows specific test:** Repeat steps PP424 and PP425 four times. Was DUT's driver correctly disabled/enabled each time?	Yes or No
PP427	Start manufactures application and start scan. Initiate 10 long bus resets while the scan is occurring. Did the scan occur with no interruptions?[1]	Yes or No
PP428	Start manufactures application and start scan. Initiate 10 short bus resets while the scan is occurring. Did the scan occur with no interruptions?	Yes or No
PP429	Start manufactures application and initiate a scan and capture and image? Was image correctly displayed?	Yes or No

[1] If interruptions occur the tester may use tools to determine if the cause of the interruption is the DUT or other components in the system.

PP4210	Start manufactures application and initiate a scan and capture and image? Was image correctly saved?	Yes or No
PP4211	Repeat steps PP429 and PP4210 four times. Was the image correctly displayed and saved each time?	Yes or No
PP4212	With the Reference Device active connect DUT. Put the Reference Device into the sleep/suspend state. Did the Reference Device correctly enter the sleep/suspend state successfully?	Yes or No
PP4213	With the Reference Device in the sleep/suspended state, wake/resume the Reference Device. Did the Reference Device wake/resume successfully?	Yes or No
PP4214	Repeat steps PP4212 and PP4213 four times. Was each sleep/suspend and wake/resume completed successfully?	Yes or No
PP4215	With the Reference Device powered off connect the DUT.	-
PP4216	Power the Reference Device, was the DUT correctly listed in the Reference Device's device manger/registry?	Yes or No
PP4217	Power down the Reference Device, did the Reference Device correctly power down?	Yes or No
PP4218	Repeat steps PP4215 through PP4217 four times. Was each step completed successfully?	Yes or No

6 Network Tests

6.1 Purpose

The purpose of this test is to check that other devices on the IEEE-1394 bus are not adversely affected when the DUT is connected to the bus or begins operation.

6.2 Basic configuration and topology

If the DUT advertises operation under multiple platforms/operating systems one of each platform/operating system should be tested.

Example:
- Windows PC with Windows 7
- Linux PC
- Mac PC

Connect the following reference devices to the IEEE-1394 bus (one from each category)

Personal Computer (Windows, Mac, Linux, etc…)

DV device (camcorder) – This device shall be IEEE-1394a only (not 1394b)

SBP2 Hard Disk Drive

Bus analyzer or equivalent

Hub(s) - If only three port hubs are available (example IEEE-1394b) then multiple hubs maybe used or branching from other devices in the topology is also acceptable.

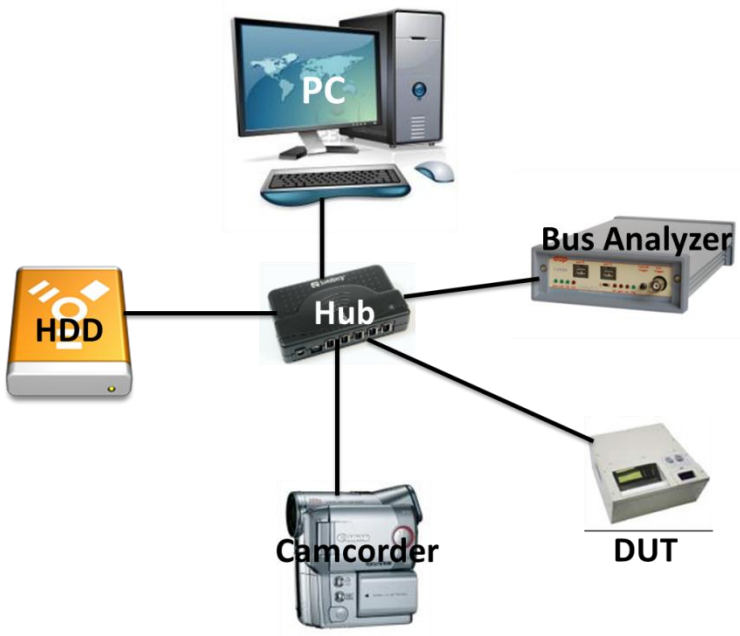

Figure 1 - Base network topology diagram.

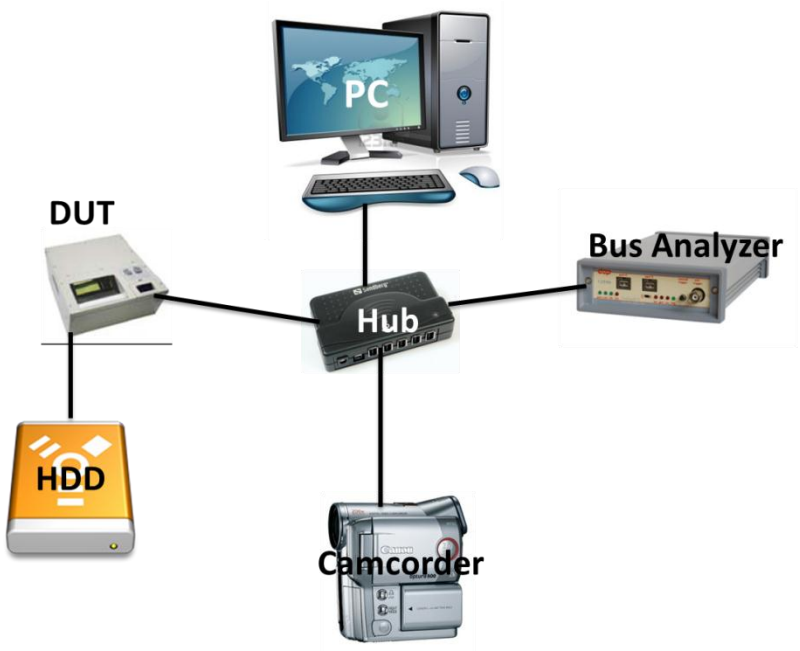

Figure 2 - Multiple port network topology diagram.

6.3 Determination of reference device

This section defines how to select reference devices.

Select devices from CH category according to the following order of priority:

a) Select the devices with 1394TA compliance logo from other companies.
b) Select the devices from other companies that are (were) available on the market.
c) Select the devices with 1394TA compliance logo from tester's (manufacture of DUT) company.
d) Select the devices from tester's (manufacture of DUT) company that are (were) available on the market.

6.4 IEEE-1394b reference devices

If DUT is an IEEE-1394b capable device then the Hub, HDD, and PC shall be IEEE-1394b capable and the camcorder shall be IEEE-1394a. If DUT is not an IEEE-1394b capable device then the Hub and PC are recommended to be IEEE-1394b capable. If a five port Hub is not available then multiple Hubs maybe used to enable the appropriate number of connections.

6.5 Common Test

Common test must be executed regardless of the type of the DUT. This set of tests checks that both Isochronous and Asynchronous transmissions of the other devices are not affected while they are operating on the bus, when the DUT is connected and disconnected. Operations such as "file copy" may be accomplished by any procedure.

6.5.1 Network Common Test

Test ID	Test Description	Test Results
NT511	Establish base topology, without DUT, as shown in Figure 1.	-

NT512	Wait for all bus traffic to stop, except cycle start and isochronous packets	-
NT513	Verify Camcorder or PC is root.	-
NT514	Connect DUT to Hub and verify:	-
NT515	Is number of bus resets less than three (3)?	Yes or No
NT516	Is Camcorder or PC root?	Yes or No
NT517	Is the number of self-ID's equal to number of nodes in topology	Yes or No
NT518	Repeat steps NT514 through NT517 two times. Did each test complete successfully.	Yes or No
NT519	Set DUT's RHB using a PHY Configuration packet, initiate a bus reset and verify:	-
NT5110	Is number of bus resets less than three(3)?	Yes or No
NT5111	Is the Camcorder or PC root?	Yes or No
NT5112	Is the number of self-IDs equal to the number of nodes in the topology?	Yes or No
NT5113	Repeat steps NT519 through NT5112 two more times. Did each test complete successfully?	Yes or No
NT5114	Establish base topology, without DUT, as shown in Figure 1.	-
NT5115	Wait for all bus traffic to stop, except cycle start and isochronous packets.	-
NT5116	Make sure the Camcorder or PC are root.	-
NT5117	Start capture of isochronous stream from the Camcorder by the PC.	-
NT5118	Connect DUT to the Hub and verify:	-
NT5119	Did connection of DUT cause little or no noticeable interruption[2] of audio/video?	Yes or No
NT5120	Repeats steps NT5114 through NT5119 four more times. Did each test complete successfully?	Yes or No
NT5121	Establish base topology, without DUT, as shown in Figure 1.	-
NT5122	Wait for all bus traffic to stop, except cycle start and isochronous packets.	-
NT5123	Make sure the Camcorder or PC are root.	-
NT5124	Start capture of isochronous stream from Camcorder to PC.	-

[2] Within IEEE-1394 networks expectation of audio/video reliability are very high. However, given OS inefficiencies connection of new devices may disrupt other tasks being performed (such as storage of isochronous stream). Therefore the test operator must use their judgment when defining 'little'.

NT5125	Start maximum (supported by PC and HDD) speed and size asynchronous transfers between PC and HDD.	-
NT5126	Connect DUT to Hub and verify:	-
NT5127	Did connection of DUT cause little or no noticeable interruption[3] of audio/video?	Yes or No
NT5128	Did connection of DUT cause little or no noticeable interruption[4] of HDD transactions?	Yes or No
NT5129	Disconnect DUT from Hub	-
NT5130	Repeats steps NT5122 through NT5129 four more times. Did each test complete successfully	Yes or No
-	**The following test only applies if DUT has more than one port**	-
NT5131	**Establish the topology shown in** Figure 2.	-
NT5132	Wait for all bus traffic to stop, except cycle start and isochronous packets	-
NT5133	Verify Camcorder or PC are root.	-
NT5134	Start capture of isochronous stream from camcorder to PC	-
NT5135	Write two giga-byte file to HDD from PC	-
NT5136	Did isochronous transfer complete with no noticeable interruption of audio/video?	Yes or No
NT5137	Did HDD transfer complete with no errors?	Yes or No
NT5138	Repeat steps NT5134 through NT5138 four more times. Did each test complete successfully?	Yes or No
-	**The following test applies to all devices**	-
NT5139	**Establish the topology shown in Figure 1 or** Figure 2 if DUT has multiple ports	-
NT5140	Wait for all bus traffic to stop, except cycle start and isochronous packets	-
NT5141	Verify Camcorder or PC are root.	-
NT5142	Start capture of isochronous stream from camcorder to PC	-

[3] Within IEEE-1394 networks expectation of audio/video reliability are very high. However, given OS inefficiencies connection of new devices may disrupt other tasks being performed (such as storage of isochronous stream). Therefore the test operator must use their judgment when defining 'little'.

[4] Some HDDs are known to not handle bus resets during data transfer gracefully. The tester should take care to verify that the reference HDD does handle bus resets during data transfer gracefully before use in this test.

NT5143	Write two giga-byte file to HDD from PC	-
NT5144	Start manufactures application and initiate a scan and capture and image? Was image correctly displayed?	Yes or No
NT5145	Start manufactures application and initiate a scan and capture and image? Was image correctly saved?	Yes or No
NT5146	Did isochronous transfer complete with no noticeable interruption of audio/video?	Yes or No
NT5147	Did HDD transfer complete with no errors?	Yes or No
NT5148	Repeat steps NT5142 through NT5147 four more times. Did each test complete successfully?	Yes or No

Annex A
(informative)

Bibliography

[B1] IEEE Std 1212-2001, Standard for a Control and Status Registers (CSR) Architecture for microcomputer buses

[B2] IEEE Std 1394-1995, Standard for a High Performance Serial Bus

[B3] IEEE Std 1394a-2000, Standard for a High Performance Serial Bus—Amendment 1

[B4] IEEE Std 1394b-2002, Standard for a High Performance Serial Bus—Amendment 2

[B5] IEEE Std 1394-2008, Standard for High Performance Serial Bus

[B6] ISO/IEC 9899:1990, Programming Languages—C