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INFORMATION TECHNOLOGY – SMALL COMPUTER SYSTEM INTERFACE (SCSI) –

Part 154: Serial Attached SCSI - 3 (SAS-3)

FOREWORD

- 1) ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.
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International Standard ISO/IEC 14776-154 was prepared by subcommittee 25: Interconnection of information technology equipment, of ISO/IEC joint technical committee 1: Information technology.

This publication contains attached files in the form of S-parameter files required for electrical performance measurements and examples of scripts for running simulations.

The list of all currently available parts of the ISO/IEC 14776 series, under the general title *Information technology – Small computer system interface (SCSI)*, can be found on the IEC web site.

This International Standard has been approved by vote of the member bodies and the voting results may be obtained from the address given on the second title page.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2, except as described in 3.4 and 3.5..

IMPORTANT - The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

General

The SCSI family of standards provides for many different transport protocols that define the rules for exchanging information between different SCSI devices. This document specifies the functional requirements for the Serial Attached SCSI (SAS) physical interconnect, which is compatible with the Serial ATA physical interconnect. The SAS Protocol Layer - 3 (SPL-3) standard documents the SAS protocol layer corresponding to the Serial Attached SCSI - 3 (SAS-3), defining the rules for exchanging information between SCSI devices using a serial interconnect. Other SCSI transport protocol standards define the rules for exchanging information between SCSI devices using other interconnects.

Figure 1 shows the relationship of this document to the other standards and related projects in the SCSI family of standards.

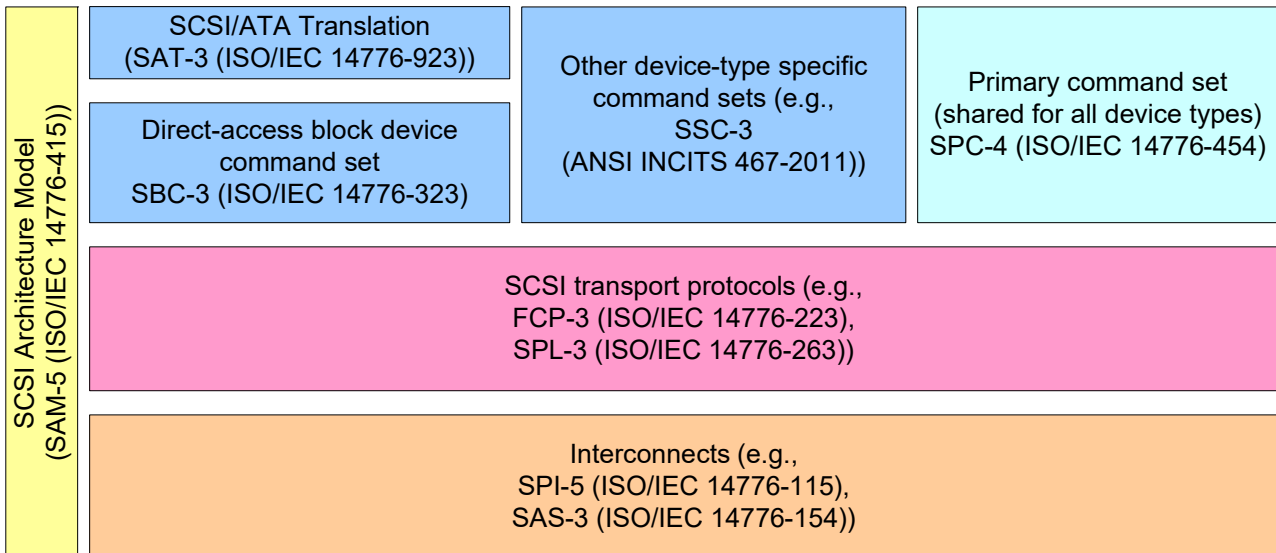


Figure 1 – SCSI document relationships

Figure 2 shows the relationship of this document to other standards and related projects in the ATA family of standards.

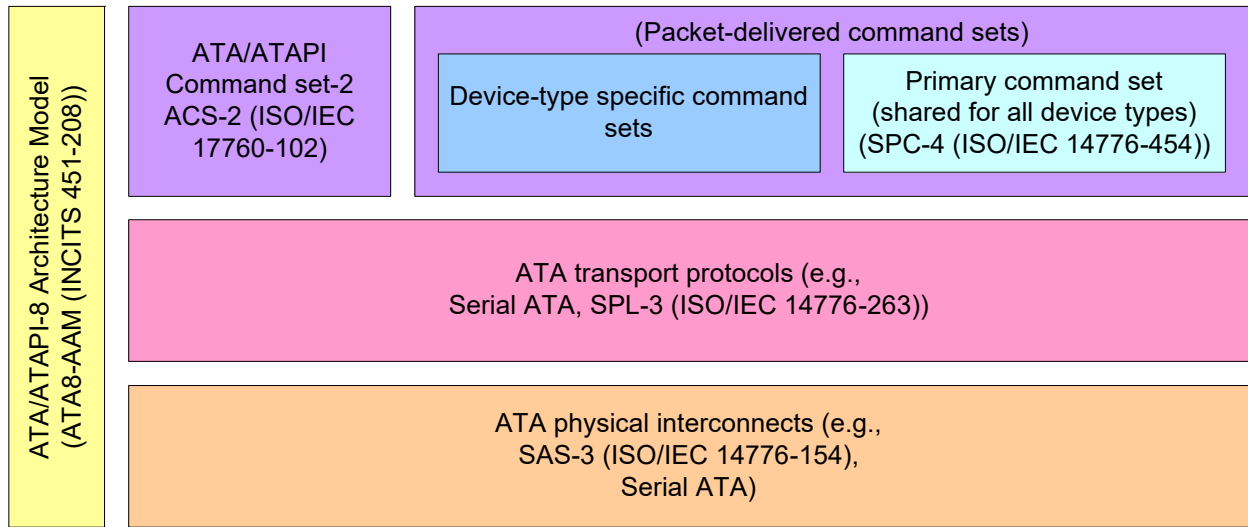


Figure 2 – ATA document relationships

Figure 1 and figure 2 show the general relationship of the documents to one another, and do not imply a relationship such as a hierarchy, protocol stack or system architecture.

These standards specify the interfaces, functions and operations necessary to ensure interoperability between conforming implementations. This document is a functional description. Conforming implementations may employ any design technique that does not violate interoperability.

INFORMATION TECHNOLOGY – SMALL COMPUTER SYSTEM INTERFACE (SCSI) –

Part 154: Serial Attached SCSI - 3 (SAS-3)

1 Scope

This part of ISO/IEC 14776 defines the physical layer of the Serial Attached SCSI (SAS) interconnect.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC TR 14165-117, *Information technology – Fibre channel – Part 117: Methodologies for jitter and signal quality (MJSQ)*^{1 2}

ISO/IEC 14776-151, *Information technology - Small Computer System Interface (SCSI) – Part 151: Serial Attached SCSI -1.1 (SAS-1.1)*

ISO/IEC 14776-153, *Information Technology - Small Computer System Interface (SCSI) – Part 153: Serial Attached SCSI - 2.1 (SAS-2.1)*

INCITS 457-2010, *Information Technology - Serial Attached SCSI - 2 (SAS-2)*

INCITS 492-2015, *SAS Protocol Layer-3 (SPL-3)*

INCITS 515-2016, *SCSI Architecture Model - 5 (SAM-5)*

Serial ATA Revision 3.1 (SATA). 18 July 2011³

SFF-8086, *Compact Multilane Series: Common Elements*⁴

SFF-8087, *Compact Multilane Series: Unshielded*⁴

SFF-8088, *Compact Multilane Series: Shielded*⁴

SFF-8147, *54mm x 71mm Form Factor w/micro SAS Connector*⁴

SFF-8223, *2.5" Drive Form Factor with Serial Connector*⁴

SFF-8323, *3.5" Drive Form Factor with Serial Connector*⁴

SFF-8410, *HSS Copper Testing and Performance Requirements*⁴

SFF-8416, *Measurement and Performance Requirements for HPEI Bulk Cable*⁴

SFF-8449, *Mini Multilane Series Management Interface*⁴

SFF-8460, *HSS Backplane Design Guidelines*⁴

SFF-8484, *Multi-Lane Unshielded Serial Attachment Connectors*⁴

SFF-8485, *Serial GPIO (SGPIO) Bus*⁴

SFF-8486, *Serial Attachment Micro Connector*⁴

1. INCITS TR-35-2004

2. When MJSQ is referenced from this document, the FC Port terminology used within MJSQ is substituted with SAS phy terminology.

3. Serial ATA specifications are available from the Serial ATA International Organization (see <http://www.sata-io.org>).

4. SFF specifications are available from the SNIA SFF Technology Affiliate (see <http://www.snia.org/sff>).

SFF-8523, *5.25" Drive Form Factor with Serial Connector* ⁴
SFF-8630, *Serial Attachment 12 Gbs 4X Unshielded Connector (Style B)* ⁴
SFF-8636, *Shielded Cables Common Management Interface* ⁴
SFF-8639, *Multifunction 12 Gb/s 6X Unshielded Connector* ⁴
SFF-8643, *Mini Multilane Series: Unshielded HD Integrated Connector* ⁴
SFF-8644, *Mini Multilane Series: Shielded HD Integrated Connector* ⁴
SFF-8680, *Serial Attachment 12 Gb/s 2X Unshielded Connector* ⁴
SFF-8685, *QSFP+ 14 Gb/s 4X Pluggable Transceiver Solution (QSFP14)* ⁴
SFF-9639, *Multifunction 12 Gb/s 6X Unshielded Connector Pinouts* ⁴
Touchstone® *File Format Specification*. Revision 1.1. IBIS Open Forum ¹

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