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INCITS 514-2014

American National Standard

*for Information Technology –
SCSI Block Commands - 3 (SBC-3)*

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INCITS 514-2014

American National Standard
for Information Technology –

SCSI Block Commands - 3 (SBC-3)

Secretariat

Information Technology Industry Council

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Abstract

This standard specifies the functional requirements for the SCSI Block Commands - 3 (SBC-3) command set. SBC-3 permits SCSI block logical units such as rigid disks to attach to computers and provides the definition for their use.

This standard maintains a high degree of compatibility with the SCSI Block Commands (SBC-2) command set, INCITS 405-2005, and while providing additional functions, is not intended to require changes to presently installed devices or existing software.

American National Standard

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Dedication

This standard is dedicated to the memory of Mark S. Evans, who was the editor from 2007 to 2013.

Mark was an active member of the T10 INCITS Technical Committee since October 1995 where he served as the T10 Vice-Chair from November 2007. In addition to being an editor and vice-chair Mark contributed in excess of 100 proposals to the various T10 standards. In many ways the fabric of what is currently looked on as "the SCSI standards" is as a result of Mark's proposals and his many other contributions.

Mark spent his working career working at various storage related companies in California including Komag, Quantum, Maxtor, and Western Digital.

Mark lived most of his life in Sunnyvale, California and recently moved to Waldport, Oregon. He enjoyed the outdoors, working in his yard, playing guitar, and traveling. He spent most of his free time volunteering in service organizations.

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Foreword (This foreword is not part of American National Standard INCITS 514-2014.)

The purpose of this standard is to define the model and command set extensions to be used in conjunction with the SCSI Primary Command Set standard – 4 (SPC-4) to facilitate operation of SCSI direct-access block devices (e.g., hard disk drives).

This standard contains eight informative annexes, which are not considered part of the standard.

Requests for interpretation, suggestions for improvement and addenda, or defect reports are welcome. They should be sent to the INCITS Secretariat, International Committee for Information Technology Standards, Information Technology Institute Council, 1101 K Street, NW, Suite 610, Washington, DC 20005.

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Introduction

The standard is organized as follows:

- Clause 1 (Scope) describes the relationship of this standard to the SCSI family of standards.
 - Clause 2 (Normative references) provides references to other standards and documents.
 - Clause 3 (Definitions, symbols, abbreviations, keywords, and conventions) defines terms and conventions used throughout this standard.
 - Clause 4 (Direct access block device type model) provides an overview of the direct-access block device type.
 - Clause 5 (Commands for direct access block devices) defines commands specific to direct-access block devices.
 - Clause 6 (Parameters for direct access block devices) defines address descriptors, diagnostic pages, mode parameters and pages, log pages, VPD pages, and copy manager parameters specific to direct-access block devices.
-
- Informative Annex A (Numeric order codes) summarizes service action assignments for variable-length commands and commands using the SERVICE ACTION IN operation code and SERVICE ACTION OUT operation code.
 - Informative Annex B (XOR command examples) provides examples of XOR command usage.
 - Informative Annex C (CRC example in C) provides example C code for generating the CRC contained in the protection information LOGICAL BLOCK GUARD field.
 - Informative Annex D (Sense information for locked or encrypted logical units) describes the conditions relative to the sense key and the additional sense code returned by the device server with the CHECK CONDITION status for a SCSI target device that is locked or encrypted.
 - Informative Annex E (Optimizing block access characteristics) describes an example method that application clients may use to achieve optimal performance for logical block access.
 - Informative Annex F (Logical block provisioning reporting examples) provides examples of implementations for different methods of reporting logical block provisioning.
 - Informative Annex G (Discovering referrals examples) provides examples for referrals with no user data segment multiple and referrals with a non-zero user data segment multiplier.
 - Informative Annex H (Bibliography) provides a list of informative references for this standard.

SCSI standards family

Figure 0 shows the relationship of this standard to the other standards and related projects in the SCSI family of standards as of the publication of this standard.

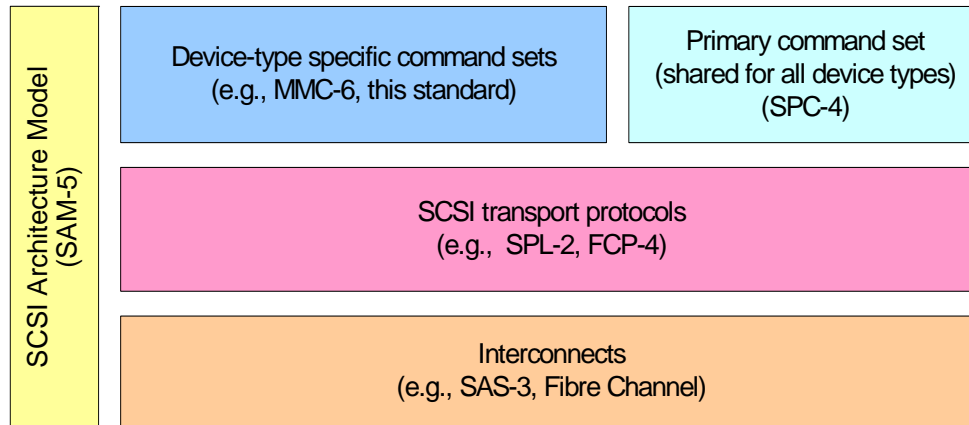


Figure 0 — SCSI document relationships

Figure 0 is intended to show the general relationship of the documents to one another and is not intended to imply a relationship such as a hierarchy, protocol stack, or system architecture.

The set of SCSI standards specifies the interfaces, functions, and operations necessary to ensure interoperability between conforming SCSI implementations. This standard is a functional description. Conforming implementations may employ any design technique that does not violate interoperability. See SAM-5 for more information about the relationships between the SCSI standards.

This standard makes obsolete the following concepts from SBC-2:

- a) linked commands;
- b) the partial medium indicator (PMI) bit and the LOGICAL BLOCK ADDRESS field in the READ CAPACITY (10) command and the READ CAPACITY (16) command;
- c) the READ (6) command and the WRITE (6) command;
- d) the XDREAD (10) command, the XDREAD (32) command, the XDWRITE (10) command, and the XDWRITE (32) command;
- e) the SYNC_NV bit in the SYNCHRONIZE CACHE commands;
- f) the FUA_NV bit in read commands;
- g) the FUA_NV bit in write commands;
- h) the LBDATA bit and the PBDATA bit in the WRITE SAME commands;
- i) the initialization pattern modifier (IP MODIFIER) field in the initialization pattern descriptor in the FORMAT UNIT command; and
- j) the XOR Control mode page.

American National Standard
for Information Technology -

SCSI Block Commands – 3 (SBC-3)

1 Scope

This standard defines the command set extensions to facilitate operation of SCSI direct access block devices. The clauses in this standard, implemented in conjunction with the applicable clauses of SPC-4, specify the standard command set for SCSI direct access block devices.

The objectives of this standard are to:

- a) permit an application client to communicate over a SCSI service delivery subsystem (see SAM-5) with a logical unit that declares itself to be a direct access block device in the PERIPHERAL DEVICE TYPE field of the standard INQUIRY data (see SPC-4); and
- b) define commands and parameters unique to the direct access block device type.

2 Normative references

2.1 Normative references overview

The following standards contain provisions that, by reference in the text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed below.

Copies of the following documents may be obtained from ANSI:

- a) approved ANSI standards;
- b) approved and draft international and regional standards (e.g., ISO, IEC); and
- c) approved and draft foreign standards (e.g., JIS and DIN).

For further information, contact ANSI Customer Service Department at (212) 642-4980 (phone), (212) 302-1286 (fax) or via the World Wide Web at <http://www.ansi.org>.

Additional availability contact information is provided below as needed.

2.2 Approved references

At the time of publication, the following referenced standards were approved.

- ISO/IEC 14776-342, *SCSI-3 Controller Commands - 2 (SCC-2)* (ANSI INCITS 318-1998)
- ISO/IEC 14776-262, *SAS Protocol Layer-2 (SPL-2)* (ANSI INCITS 505-2013)
- INCITS 468-2010, *Multi-Media Commands - 6 (MMC-6)*
- INCITS 468-2010/AM 1 *MultiMedia Command Set - 6 - Amendment 1 (MMC-6/AM 1)*

2.3 References under development

At the time of publication, the following referenced standards were still under development. For information on the current status of the documents, or regarding availability, contact the relevant standards body as indicated.

- ISO/IEC 14776-415, *SCSI Architecture Model - 5 (SAM-5)* (T10/2104-D)
- ISO/IEC 14776-454, *SCSI Primary Commands - 4 (SPC-4)* (T10/1731-D)
- ISO/IEC 14776-373, *SCSI Enclosure Services - 3 (SES-3)* (T10/2149-D)
- ISO/IEC 14776-923, *SCSI / ATA Translation - 3 (SAT-3)* (T10/2126-D)