

INCITS 513-2015

American National Standard

*for Information Technology –
SCSI Primary Commands - 4 (SPC-4)*

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INCITS 513-2015

American National Standard
for Information Technology –
SCSI Primary Commands - 4 (SPC-4)

Secretariat

Information Technology Industry Council

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Abstract

This standard defines the device model for all SCSI devices. This standard defines the SCSI commands that are basic to every device model and the SCSI commands that may apply to any device model.

American National Standard

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Foreword (This foreword is not part of American National Standard INCITS 513-2015.)

The SCSI command set is designed to provide efficient peer-to-peer operation of SCSI devices (e.g., disks, tapes, media changers) by an operating system. The SCSI command set assumes an underlying command-response protocol.

The SCSI command set provides multiple operating systems concurrent control over one or more SCSI devices. However, proper coordination of activities between the multiple operating systems is critical to avoid data corruption. Commands that assist with coordination between multiple operating systems are described in this standard. However, details of the coordination are beyond the scope of the SCSI command set.

This standard defines the device model for all SCSI devices. This standard defines the SCSI commands that are basic to every device model and the SCSI commands that may apply to any device model.

This standard contains eight informative annexes, all of 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, National Committee for Information Technology Standards, Information Technology Industry Council, 1101 K Street NW, Suite 610, Washington, DC 20005-7031.

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Introduction

The SCSI Primary Commands - 4 (SPC-4) standard is divided into the following clauses and annexes:

Clause 1 is the scope.

Clause 2 enumerates the normative references that apply to this standard.

Clause 3 describes the definitions, symbols, and abbreviations used in this standard.

Clause 4 describes the conceptual relationship between this document and the SCSI-3 Architecture Model.

Clause 5 describes the command model for all SCSI devices.

Clause 6 defines the commands that may be implemented by any SCSI device.

Clause 7 defines the parameter data formats that may be implemented by any SCSI device.

Clause 8 defines the well known logical units that may be implemented by any SCSI device.

Clause 9 defines the commands supported by the security manager component of command security.

Annex A identifies differences between the terminology used in this standard and previous versions of this standard. (informative)

Annex B provides examples of the parameter data returned by the REPORT LUNS command. (informative)

Annex C describes the PERSISTENT RESERVE OUT command features necessary to replace the reserve/release management method and provides guidance on how to perform a third party reservation using persistent reservations. (informative)

Annex D provides information about the third-party copy commands and copy manager. (informative)

Annex E identifies the differences between security protocols defined by other standards (e.g., IKEv2 (see RFC 4306)) and the equivalent protocols defined by this standard (e.g., the IKEv2-SCSI SA creation protocol). (informative)

Annex F lists code values in numeric order. (informative)

Annex G lists assigned vendor identifiers. (informative)

Annex H is the bibliography. (informative)

The annexes provide information to assist with implementation of this standard. The information in the annexes applies to all command standards.

SCSI standards family

Figure 1 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.

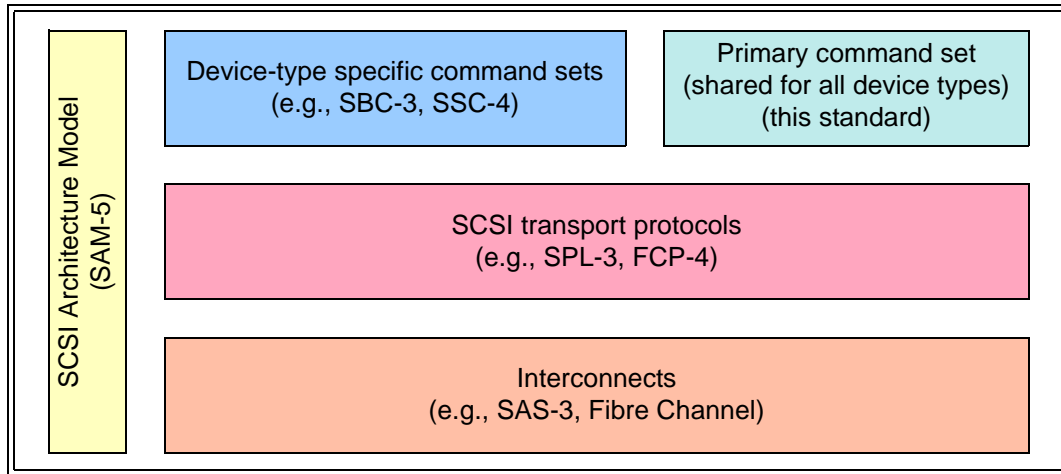


Figure 1 — SCSI document structure

The SCSI document structure in figure 1 is intended to show the general applicability of the documents to one another. Figure 1 is not intended to imply a relationship such as a hierarchy, protocol stack, or system architecture.

SCSI Architecture Model: Defines the SCSI systems model, the functional partitioning of the SCSI standard set and requirements applicable to all SCSI implementations and implementation standards.

Device-Type Specific Command Sets: Implementation standards that define specific device types including a device model for each device type. These standards specify the required commands and behaviors that are specific to a given device type and prescribe the requirements to be followed by a SCSI initiator device when sending commands to a SCSI target device having the specific device type. The commands and behaviors for a specific device type may include by reference commands and behaviors that are shared by all SCSI devices.

Shared Command Set: An implementation standard that defines a model for all SCSI device types. This standard specifies the required commands and behavior that is common to all SCSI devices, regardless of device type, and prescribes the requirements to be followed by a SCSI initiator device when sending commands to any SCSI target device.

SCSI Transport Protocols: Implementation standards that define the requirements for exchanging information so that different SCSI devices are capable of communicating.

Interconnects: Implementation standards that define the communications mechanism employed by the SCSI transport protocols. These standards may describe the electrical and signaling requirements essential for SCSI devices to interoperate over a given interconnect. Interconnect standards may allow the interconnection of devices other than SCSI devices in ways that are outside the scope of this standard.

The term SCSI is used to refer to the family of standards described in this subclause.

At the time this standard was generated, examples of the SCSI general structure included:

Interconnects:

Fibre Channel Arbitrated Loop - 2	FC-AL-2	[ISO/IEC 14165-122] [INCITS 332-1999] [INCITS 332/AM1-2003] [INCITS 332/AM2-2006]
Fibre Channel Physical Interfaces	FC-PI	[ISO/IEC 14165-115] [INCITS 352-2002]
Fibre Channel Physical Interfaces - 2	FC-PI-2	[ISO/IEC 14165-142] [INCITS 404-2006]
Fibre Channel Physical Interfaces - 3	FC-PI-3	[ISO/IEC 14165-143] [T11/1625-D]
Fibre Channel Physical Interfaces - 4	FC-PI-4	[ISO/IEC 14165-144] [INCITS 450-2009]
Fibre Channel Physical Interfaces - 5	FC-PI-5	[ISO/IEC 14165-145] [INCITS 479-2011]
Fibre Channel Physical Interfaces - 6	FC-PI-6	[ISO/IEC 14165-146] [T11/2221-D]
Fibre Channel - 10 Gigabit	10GFC	[ISO/IEC 14165-116] [INCITS 364-2003] [INCITS 364/AM1-2007]
Fibre Channel Framing and Signaling Interface	FC-FS	[ISO/IEC 14165-251] [INCITS 373-2003]
Fibre Channel Framing and Signaling Interface - 2	FC-FS-2	[ISO/IEC 14165-252] [INCITS 424-2007] [INCITS 424/AM1-2007]
Fibre Channel Framing and Signaling Interface - 3	FC-FS-3	[ISO/IEC 14165-253] [T11/1861-D]
Fibre Channel Link Services	FC-LS	[INCITS 433-2007]
Fibre Channel Link Services - 2	FC-LS-2	[T11/2103-D]
Fibre Channel Security Protocols	FC-SP	[ISO/IEC 14165-431] [INCITS 426-2007]
Fibre Channel Security Protocols - 2	FC-SP-2	[ISO/IEC 14165-432] [T11/1835-D]
High Performance Serial Bus		[ANSI IEEE 1394-1995]
High Performance Serial Bus (supplement to ANSI/IEEE 1394-1995)		[ANSI IEEE 1394a-2000]
SCSI Parallel Interface - 2	SPI-2	[ISO/IEC 14776-112] [INCITS 302-1999]
SCSI Parallel Interface - 3	SPI-3	[ISO/IEC 14776-113] [INCITS 336-2000]
SCSI Parallel Interface - 4	SPI-4	[ISO/IEC 14776-114] [INCITS 362-2002]
SCSI Parallel Interface - 5	SPI-5	[ISO/IEC 14776-115] [INCITS 367-2003]
Serial Storage Architecture Physical Layer 1	SSA-PH	[INCITS 293-1996]
Serial Storage Architecture Physical Layer 2	SSA-PH-2	[INCITS 307-1998]
Serial Attached SCSI	SAS	[ISO/IEC 14776-150] [INCITS 376-2003]
Serial Attached SCSI - 1.1	SAS-1.1	[ISO/IEC 14776-151] [INCITS 417-2006]

Serial Attached SCSI - 2	SAS-2	[ISO/IEC 14776-152] [INCITS 457-2010]
Serial Attached SCSI - 2.1	SAS-2.1	[ISO/IEC 14776-153] [INCITS 478-2011]
Serial Attached SCSI - 3	SAS-3	[ISO/IEC 14776-154] [T10/BSR INCITS 519]
Serial Attached SCSI - 4	SAS-4	[ISO/IEC 14776-155] [T10/BSR INCITS 534]
PCI Express® Queuing Interface	PQI	[ISO/IEC 14776-171] [T10/BSR INCITS 490]
PCI Express® Queuing Interface - 2	PQI-2	[ISO/IEC 14776-171] [T10/BSR INCITS 507]
 SCSI Transport Protocols:		
Automation/Drive Interface - Transport Protocol	ADT	[INCITS 406-2005]
Automation/Drive Interface - Transport Protocol - 2	ADT-2	[INCITS 472-2011]
Serial Storage Architecture Transport Layer 1	SSA-TL-1	[INCITS 295-1996]
Serial Storage Architecture Transport Layer 2	SSA-TL-2	[INCITS 308-1998]
SCSI-3 Fibre Channel Protocol	FCP	[ISO/IEC 14776-221] [INCITS 269-1996]
Fibre Channel Protocol for SCSI - 2	FCP-2	[ISO/IEC 14776-222] [INCITS 350-2003]
Fibre Channel Protocol for SCSI - 3	FCP-3	[ISO/IEC 14776-223] [INCITS 416-2006]
Fibre Channel Protocol for SCSI - 4	FCP-4	[ISO/IEC 14776-223]
Serial Bus Protocol - 2	SBP-2	[ISO/IEC 14776-232] [INCITS 325-1998]
Serial Bus Protocol - 3	SBP-3	[INCITS 375-2004]
Serial Storage Architecture SCSI-3 Protocol	SSA-S3P	[INCITS 309-1998]
SCSI RDMA Protocol	SRP	[ISO/IEC 14776-241] [INCITS 365-2002]
USB Attached SCSI	UAS	[ISO/IEC 14776-251] [INCITS 471-2010]
USB Attached SCSI - 2	UAS-2	[ISO/IEC 14776-252] [T10/BSR INCITS 520]
SAS Protocol Layer	SPL	[ISO/IEC 14776-261] [INCITS 476-2011] [INCITS 476-2011/ AM1-2012]
SAS Protocol Layer - 2	SPL-2	[ISO/IEC 14776-262] [INCITS 505-2013]
SAS Protocol Layer - 3	SPL-3	[ISO/IEC 14776-263] [T10/BSR INCITS 492]
SAS Protocol Layer - 4	SPL-4	[ISO/IEC 14776-264] [T10/BSR INCITS 538]
SCSI over PCI Express®	SOP	[ISO/IEC 14776-271] [T10/BSR INCITS 489]
SCSI over PCI Express® - 2	SOP-2	[ISO/IEC 14776-272] [T10/BSR INCITS 521]

Primary Command Set:

SCSI-3 Primary Commands	SPC	[INCITS 301-1997]
SCSI Primary Commands - 2	SPC-2	[ISO/IEC 14776-452] [INCITS 351-2001]
SCSI Primary Commands - 3	SPC-3	[ISO/IEC 14776-453] [INCITS 408-2005]
SCSI Primary Commands - 4	SPC-4	[ISO/IEC 14776-454] [T10/BSR INCITS 513]
SCSI Primary Commands - 5	SPC-5	[ISO/IEC 14776-455] [T10/BSR INCITS 502]
Security Features for SCSI Commands	SFSC	[ISO/IEC 14776-481] [T10/BSR INCITS 501]

Device-Type Specific Command Sets:

SCSI-3 Block Commands	SBC	[ISO/IEC 14776-321] [INCITS 306-1998]
SCSI Block Commands - 2	SBC-2	[ISO/IEC 14776-322] [INCITS 405-2005]
SCSI Block Commands - 3	SBC-3	[ISO/IEC 14776-323] [T10/BSR INCITS 514]
SCSI Block Commands - 4	SBC-4	[ISO/IEC 14776-324] [T10/BSR INCITS 506]
Zoned-device Block Commands	ZBC	[ISO/IEC 14776-345] [T10/BSR INCITS 536]
SCSI-3 Stream Commands	SSC	[ISO/IEC 14776-331] [INCITS 335-2000]
SCSI Stream Commands - 2	SSC-2	[ISO/IEC 14776-332] [INCITS 380-2003]
SCSI Stream Commands - 3	SSC-3	[ISO/IEC 14776-333] [INCITS 467-2011]
SCSI Stream Commands - 4	SSC-4	[ISO/IEC 14776-334] [INCITS 516-2013]
SCSI Stream Commands - 5	SSC-5	[ISO/IEC 14776-335] [T10/BSR INCITS 503]
SCSI-3 Medium Changer Commands	SMC	[INCITS 314-1998]
SCSI Media Changer Commands - 2	SMC-2	[INCITS 382-2004]
SCSI Media Changer Commands - 3	SMC-3	[INCITS 484-201x]
SCSI-3 Multimedia Command Set	MMC	[INCITS 304-1997]
SCSI Multimedia Command Set - 2	MMC-2	[ISO/IEC 14776-362] [INCITS 333-2000]
SCSI Multimedia Command Set - 3	MMC-3	[INCITS 360-2002]
SCSI Multimedia Command Set - 4	MMC-4	[INCITS 401-2005]
SCSI Multimedia Command Set - 5	MMC-5	[INCITS 430-2007]
SCSI Multimedia Command Set - 6	MMC-6	[INCITS 468-2010] [INCITS 468/AM1-201x]
SCSI Controller Commands - 2	SCC-2	[ISO/IEC 14776-342] [INCITS 318-1998]
SCSI Reduced Block Commands	RBC	[ISO/IEC 14776-326] [INCITS 330-2000] [INCITS 330-2003/AM1]
SCSI-3 Enclosure Services Commands	SES	[ISO/IEC 14776-371] [INCITS 305-1998] [INCITS 305-2000/AM1]
SCSI Enclosure Services Commands - 2	SES-2	[ISO/IEC 14776-372] [INCITS 448-2008]
SCSI Enclosure Services Commands - 3	SES-3	[ISO/IEC 14776-373] [T10/BSR INCITS 518]
SCSI Specification for Optical Card Reader/Writer	OCRW	[ISO/IEC 14776-381]

Automation/Drive Interface - Commands	ADC	[INCITS 403-2005]
Automation/Drive Interface - Commands - 2	ADC-2	[INCITS 441-2008]
Automation/Drive Interface - Commands - 3	ADC-3	[INCITS 497-201x]
Object-based Storage Device Commands	OSD	[INCITS 400-2004]
Object-based Storage Device Commands - 2	OSD-2	[INCITS 458-2011]
Translation Protocols:		
SCSI / ATA Translation	SAT	[INCITS 431-2007]
SCSI / ATA Translation - 2	SAT-2	[ISO/IEC 14776-922] [INCITS 465-2010]
SCSI / ATA Translation - 3	SAT-3	[ISO/IEC 14776-923] [T10/BSR INCITS 517]
SCSI / ATA Translation - 4	SAT-4	[ISO/IEC 14776-924] [T10/BSR INCITS 491]
Architecture Model:		
SCSI-3 Architecture Model	SAM	[ISO/IEC 14776-411] [INCITS 270-1996]
SCSI Architecture Model - 2	SAM-2	[ISO/IEC 14776-412] [INCITS 366-2003]
SCSI Architecture Model - 3	SAM-3	[ISO/IEC 14776-413] [INCITS 402-2005]
SCSI Architecture Model - 4	SAM-4	[ISO/IEC 14776-414] [INCITS 447-2008]
SCSI Architecture Model - 5	SAM-5	[ISO/IEC 14776-415] [T10/BSR INCITS 515]

American National Standard
for Information Technology –

SCSI Primary Commands - 4 (SPC-4)

1 Scope

The SCSI family of standards provides for many different types of SCSI devices (e.g., disks, tapes, media changers). This standard defines a device model that is applicable to all SCSI devices. Other command standards expand on the general SCSI device model in ways appropriate to specific types of SCSI devices.

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.

This standard defines the SCSI commands that are mandatory and optional for all SCSI devices. Support for any feature defined in this standard is optional unless otherwise stated. This standard also defines the SCSI commands that may apply to any device model.

The following commands, parameter data, and features defined in previous versions of this standard are made obsolete by this standard:

- a) the TARGET RESET supported (TRS) bit and the WAKEUP supported (WAKES) bit in the REPORT SUPPORTED TASK MANAGEMENT FUNCTIONS parameter data;
- b) code value 10b (i.e., Per initiator port) in the MODE PAGE POLICY field in the mode page policy descriptor in the Mode Page Policy VPD page;
- c) the removable medium devices with an attached medium changer model, MCHNGR bit in the standard INQUIRY data, the MOVE MEDIUM ATTACHED command in disks and tapes, and the READ ELEMENT STATUS ATTACHED command in disks and tapes;
- d) linked commands;
- e) the PPC bit in the LOG SENSE command;
- f) the NUL bit in EXTENDED COPY command target descriptors (i.e., CSCD descriptors in this standard);
- g) EXTENDED COPY support for the processing of setmarks by sequential-access devices;
- h) READ BUFFER commands with the MODE field set to 00h and 1Ah; and
- i) WRITE BUFFER commands with the MODE field set to 00h, 1Ah, and 1Bh.

2 Normative references

2.1 General

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.