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INCITS 465-2010

American National Standard

*for Information Technology –
SCSI/ATA Translation - 2
(SAT-2)*

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INCITS 465-2010

American National Standard
for Information Technology –
SCSI/ATA Translation - 2
(SAT-2)

Secretariat

Information Technology Industry Council

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American National Standards Institute, Inc.

Abstract

This standard specifies a translation layer between SCSI and ATA protocols. This translation layer is used by storage controllers to emulate objects in a SCSI logical unit using an ATA device, providing capabilities defined by SCSI standards (e.g., the SCSI Block Commands (SBC-3) and SCSI Primary Commands (SPC-4) standards). For the purposes of this standard, ATA device capabilities are defined by ATA8-AAM, ATA8-ACS, ATA8-APT, ATA8-AST, and SATA-2.6.

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Foreword (This foreword is not part of American National Standard INCITS 465-2010.)

This standard provides a common set of definitions and requirements to establish common behavior among implementations that emulate SCSI device behavior through the combined use of ATA devices and a SCSI / ATA Translation layer (SATL). The SATL may reside in a host-based software or firmware, or it may reside in a separate component (e.g., a host bus adapter or external controller) with a separate processing unit to perform the translation. A SATL and ATA device combination may provide a functional subset of common SCSI capabilities. There is also a range of optional emulated SCSI capabilities that may be supported, depending on the capabilities of the SATL.

This standard defines SATL capabilities in terms of SCSI capabilities as defined by the applicable SCSI standards and working drafts, and defines the elements and use of ATA protocol to provide those SCSI capabilities and services in a consistent manner among SAT implementations that implement according to this 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 Institute, 1101 K Street, NW, Suite 610, Washington, DC 20005.

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Introduction

The SCSI / ATA Translation - 2 (SAT-2) standard is divided into the following clauses:

Clause 1 defines the scope of this standard.

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

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

Clause 4 describes the general framework for defining elements of translation between SCSI and ATA protocol.

Clause 5 describes elements of SCSI / ATA Translation that relate to the SCSI architecture model.

Clause 6 describes the mapping of command management functions in the SATL layer.

Clause 7 provide a summary of SCSI commands mapped to ATA in this standard.

Clause 8 describes the mapping between SCSI Primary Commands and ATA protocol.

Clause 9 describes the mapping between SCSI Block Commands and ATA protocol.

Clause 10 describes the mapping of mode pages, log pages, and VPD page information to selected ATA protocol elements.

Clause 11 describes error reporting and sense data conventions for SCSI / ATA Translation.

Clause 12 describes SCSI commands and mode pages to support SCSI / ATA Translation.

Annex A describes command translation for ATAPI devices.

American National Standard
for Information Technology–

SCSI/ATA Translation - 2 (SAT-2)

1 Scope

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 protocol requirements of the SCSI / ATA Translation Layer (SATL) to allow conforming SCSI / ATA translating components to interoperate with ATA devices and SCSI application layers. The SATL covers the range of implementations that use ATA devices to emulate the behavior of SCSI devices as viewed by the SCSI application layer. The primary focus of this standard is to define SCSI / ATA Translation for an ATA device (see 3.1.9).

Where possible, this standard defines SCSI / ATA Translation in a manner that is consistent with the SAM-4, SPC-4, and SBC-3 standards. In some instances, the defined function of an ATA device is different from corresponding functions defined for SCSI target devices (e.g., an ATA device provides no means to abort a single ATA queued command). The translation defined in this standard, in such cases, may not be consistent with other SCSI standards. However, in such cases, this standard specifies the expected behavior, and in what manner it is inconsistent with the behavior specified in other SCSI standards.

The objective of this standard is to allow a complete set of SCSI functions while minimizing the complexity of the SATL and preserving compatibility with existing SCSI application clients.

The objectives of the SATL are:

- a) to provide host computers with device independence with respect to the ATA devices that have user storage capacity, and with respect to various implementations of the translation layer used to emulate the behavior of SCSI target devices;
- b) to define common features and functions representing a subset of the capabilities available in SCSI devices that apply to SCSI / ATA Translation implementations;
- c) to define common methods to manage aspects of ATA devices that do not map to previously defined features and functions of SCSI, with provision made for the addition of special features and functions; and
- d) to provide consistent means for discovery and control of optional SCSI features that may or may not be emulated in SCSI / ATA translator implementations. These means are provided by specifying how transport specific features and functions are represented in a mixed-domain topology in a manner consistent with management of devices in a SCSI domain.