INTERNATIONAL STANDARD

ISO/IEC 14776-113

First edition
2002-08

Information technology – Small computer system interface (SCSI)

Part 113: Parallel Interface-3 (SPI-3)

ISO/IEC Copyright Office • Case postale 56 • CH-1211 Genève 20 • Switzerland

PRICE CODE XC

For price, see current catalogue

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SMALL COMPUTER SYSTEM INTERFACE (SCSI) –

Part 113: Parallel Interface-3 (SPI-3)

FOREWORD

1) ISO (International Organization for Standardization) and IEC (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.

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International Standard ISO/IEC 14776-113 was prepared by subcommittee 25: Interconnection of information technology equipment, of ISO/IEC joint technical committee 1: Information technology.

Annexes A, B, C, D and E form an integral part of this standard.

Annexes F, G, H, I, J, K, L, M, N and O are for information only.

Introduction

The SCSI protocol is designed to provide an efficient peer-to-peer I/O bus with the maximum number of hosts and peripherals determined by the bus width (8 or 16). Data may be transferred asynchronously or synchronously at rates that depend primarily on device implementation and cable length.

SCSI is an I/O interface that may be operated over a wide range of media and transfer rates. The objectives of the parallel interface in SCSI are:

a) To provide host computers with device independence within a class of devices. Thus, different disk drives, tape drives, printers, optical media drives, and other SCSI devices may be added to the host computers without requiring modifications to generic system hardware. Provision is made for the addition of special features and functions through the use of vendor-specific options. Reserved areas are provided for future standardization.
b) To provide compatibility such that conforming SCSI-2 and SPI-2 devices may interoperate with SPI-3 devices given that the systems engineering is correctly done. Conforming SCSI-2 and SPI-2 devices should respond in an acceptable manner to reject SPI-3 protocol extensions. SPI-3 protocol extensions are designed to be permissive of such rejections and thus allow SCSI-2 and SPI-2 devices to continue operation without requiring the use of the extensions.

The interface protocol includes provision for the connection of multiple initiators (SCSI devices capable of initiating a task) and multiple targets (SCSI devices capable of responding to a request to perform a task). Distributed arbitration (i.e., bus-contention logic) is built into the architecture of parallel SCSI. A default priority system awards interface control to the highest priority SCSI device that is contending for use of the bus and an optional fairness algorithm is defined.

This international standard enhances the functionality of the SPI-2 standard. This international standard is intended to be the choice for new designs over the SPI-2 standard. Several new features have been added into this international standard. Some of those features are; fast-80 data transfers, double transition (DT) transfers, and CRC on parallel transfers.

The SCSI Parallel Interface-3 standard is divided into the following clauses:

- Clause 1 is the scope;
- Clause 2 enumerates the normative references that apply to this standard;
- Clause 3 describes the definitions, symbols, conventions and abbreviations used in this standard;
- Clause 4 describes the SCSI parallel interface model used in this standard;
- Clause 5 describes the connectors;
- Clause 6 describes the cable characteristics;
- Clause 7 describes the electrical characteristics;
- Clause 8 describes the SCSI bus signals;
- Clause 9 describes the SCSI parallel bus timing;
- Clause 10 describes the SCSI bus phases;
- Clause 11 describes the DATA BUS protection;
- Clause 12 describes the SCSI bus conditions;
- Clause 13 describes the SCSI bus phase sequences;
- Clause 14 describes the SPI information unit sequences;
- Clause 15 describes the SCSI pointers;
- Clause 16 describes the SCSI messages;
- Clause 17 describes the Command processing considerations and exception conditions;
- Clause 18 describes the SCSI management features for the SCSI parallel interface;
- Clause 19 describes the SCSI parallel interface services;

Small Computer System Interface (SCSI) Part 113: Parallel Interface-3 (SPI-3)

1 Scope

This standard defines the mechanical, electrical, timing, and protocol requirements of the SCSI parallel interface to allow conforming SCSI devices to inter-operate. The SCSI parallel interface is a local I/O bus that may be operated over a wide range of transfer rates. The objectives of the SCSI parallel interface are:

a) To provide host computers with device independence within a class of devices. Thus, different disk drives, tape drives, printers, optical media drives and other SCSI devices may be added to the host computers without requiring modifications to generic system hardware. Provision is made for the addition of special features and functions through the use of vendor-specific options. Reserved areas are provided for future standardization.
b) To provide compatibility such that conforming SCSI-2 and SPI-2 devices may interoperate with SPI-3 devices given that the systems engineering is correctly done. Conforming SCSI-2 and SPI-2 devices should respond in an acceptable manner to reject SPI-3 protocol extensions. SPI-3 protocol extensions are designed to be permissive of such rejections and thus allow SCSI-2 and SPI-2 devices to continue operation without requiring the use of the extensions.

The interface protocol includes provision for the connection of multiple initiators (SCSI devices capable of initiating an I/O process) and multiple targets (SCSI devices capable of responding to a request to perform an I/O process). Distributed arbitration (i.e., bus-contention logic) is built into the architecture of this standard. A default priority system awards interface control to the highest priority SCSI device that is contending for use of the bus and an optional fairness algorithm is defined.

This standard defines the physical attributes of an input/output bus for interconnecting computers and peripheral devices.

This standard has made obsolete the following:

a) The high voltage differential (HVD) option of differential driver/receivers. Implementations that use HVD should reference the SCSI Parallel Interface-2 standard (ISO/IEC 14776-112).
b) The 32-bit SCSI bus width option. Implementations that use 32-bit wide buses should reference the SCSI Parallel Interface-2 standard (ISO/IEC 14776-112).
c) The SCSI configured automatically (SCAM) option. Implementations that use SCAM should reference the SCSI Parallel Interface-2 standard (ISO/IEC 14776-112).
d) The CONTINUE TASK message and the TARGET TRANSFER DISABLE message. Implementations that use the CONTINUE TASK message or TARGET TRANSFER DISABLE message should reference the SCSI Parallel Interface-2 standard (ISO/IEC 14776-112).

Figure 1 is intended to show the general structure of SCSI standards. The figure is not intended to imply a relationship such as a hierarchy, protocol stack, or system architecture.

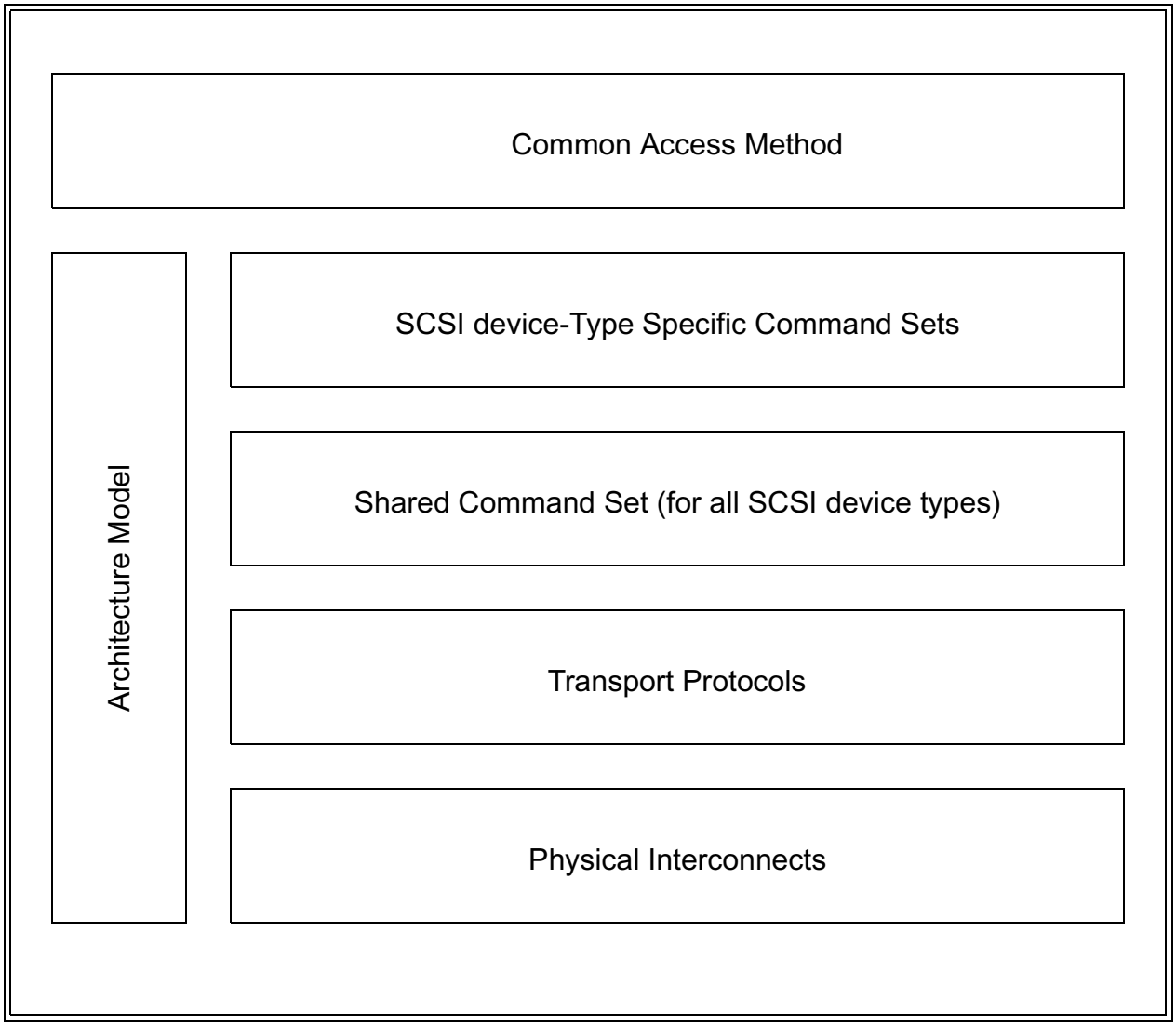

Figure 1 - General Structure of SCSI

2 Normative references

2.1 Normative references

The following standards contain provisions which, through 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.

Members of IEC and ISO maintain registers of currently valid standards.

2.2 Approved references

EIA-700A0AE (SP-3651), Detail Specification for Trapezoidal Connectors with Non-removable Ribbon *Contacts on 1.27 mm Pitch Double Row used with Single Connector Attachments (SCA-2)*

EIA-700A0AF (SP-3652), Detail Specification for Trapezoidal Connector 0.8 mm Pitch used with Very High *Density Cable Interconnect (VHDCI)*

IEC 60512-2:1985, *Electromechanical components for electronic equipment; basic testing procedures and measuring methods – Part 2: General examination, electrical continuity and contact resistance tests, insulation tests and voltage stress tests*

IEC 60512-11-7:1996, *Electromechanical components for electronic equipment – Basic testing procedures and measuring methods – Part 11: Climatic tests – Section 7: Test 11g: Flowing mixed gas corrosion test*

ISO 1660, *Technical drawings – Dimensioning and tolerancing of profiles*

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 document, or regarding availability, contact the relevant standards body or other organization as indicated.

ISO/IEC 14776-112, – *Information technology – Small computer system interface (SCSI) – Part 112: Parallel Interface-2 (SPI-2)*

ISO/IEC 14776-312, – *Information technology – Small computer system interface (SCSI) – Part 312: Primary Commands-2*

ISO/IEC 14776-412, – *Information technology – Small computer system interface (SCSI) – Part 412: Architecture Model-2*

2.4 Other references

For information on the current status of the listed document(s), or regarding availability, contact the indicated organization.

IEEE 1364, Verilog® Hardware Description Language