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Information technology – AT attachment with packet interface-7 – Part 1: Register delivered command set, logical register set (ATA/ATAPI-7 V1)

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CONTENTS

INFORMATION TECHNOLOGY – AT ATTACHMENT WITH PACKET INTERFACE-7 –

Part 1: Register delivered command set, logical register set (ATA/ATAPI-7 V1)

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. Their preparation is entrusted to technical committees; any ISO and IEC member body interested in the subject dealt with may participate in this preparatory work. International governmental and non-governmental organizations liaising with ISO and IEC also participate in this preparation.

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10) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

International Standard ISO/IEC 24739-1 was prepared by subcommittee 25: Interconnection of information technology equipment, of ISO/IEC joint technical committee 1: Information technology.

The list of all currently available parts of the ISO/IEC 24739 series, under the general title *Information technology – AT attachment with packet interface-7,* 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.

ISO/IEC 24739-1 is to be used in conjunction with ISO/IEC 24739-2 and ISO/IEC 24739-3.

The contents of the corrigendum of September 2013 have been included in this copy.

INTRODUCTION

ISO/IEC 24739 defines the AT attachment with packet interface (ATAPI). The standard includes the command set and two transport protocols to support parallel and serial physical interconnects. ISO/IEC 24739 is partitioned into three parts:

Part 1: Register delivered command set, logical register set (ATA/ATAPI-7 V1)

Part 2: Parallel transport protocols and physical interconnect (ATA/ATAPI-7 V2)

Part 3: Serial transport protocols and physical interconnect (ATA/ATAPI-7 V3)

ISO/IEC 24739 is partitioned in this way to separate the command set (Part 1) for ease of reference and maintenance. The command set is the same for both the parallel transport (Part 2) and the serial transport (Part 3).

Parts 1 and Part 2 were substantially derived from the prior version of this standard (ATA/ATAPI-6, ANSI INCITS 361-2002). Part 3 is new material defining the serial transport of the ATA/ATAPI interface.

All three parts have a clause that includes introductory material, a common glossary and an index to the major clauses of the other two parts. After Clause 3 in each of the parts, the material is part specific. Within each part, references are made to other parts, given with the full reference of the publication and major clause number, e.g. ISO/IEC 24739-3, Clause 4.

In order to implement the standard for a parallel transport, it is necessary to comply with both ISO/IEC 24739-1 and ISO/IEC 24739-2. In order to implement the serial transport, it is necessary to comply with both ISO/IEC 24739-1 and ISO/IEC 24739-3. It should be recognized, however, that the serial transport as described in ISO/IEC 24739-3 relies heavily on logical interconnect and protocol concepts and requirements described in ISO/IEC 24739-2. These concepts are called "parallel emulation" in ISO/IEC 24739-3. In some cases, references are made to the parallel implementation of ATA, which refers to the parallel transport (ISO/IEC 24739-2). The reader is strongly advised to consult all three parts when implementing the serial transport.

This International Standard (ISO/IEC 24739-1) contains the command feature sets for ATA. It defines structures used by the parallel implementation of ATA and the serial implementation of ATA. The command descriptions are in alphabetical order, with a cross-reference by command codes in Annex A.

The ISO/IEC 24739 series of standards consists of the following parts and clauses:

Part 1

Clause 1 describes the scope.

Clause 2 provides normative references for the entire standard.

Clause 3 provides definitions, abbreviations and conventions used within the entire standard.

Clause 4 describes the general operating requirements of the command layer.

Clause 5 describes the I/O registers.

Clause 6 contains descriptions of the commands.

Clauses 7 through 12 point to the material in ISO/IEC 24739-2.

Clauses 13 through 19 point to material in ISO/IEC 24739-3.

Part 2

Clause 1 describes the scope.

Clause 2 provides normative references for the entire standard.

Clause 3 provides definitions, abbreviations and conventions used within the entire standard.

Clauses 4, 5 and 6 point to the material in ISO/IEC 24739-1.

Clause 7 contains the electrical and mechanical characteristics.

Clause 8 contains the signal descriptions.

Clause 9 describes the general operating requirements of the physical, data link and transport layers.

Clause 10 contains describes register addressing.

Clause 11 contains the transport protocols.

Clause 12 contains the interface timing diagrams.

Clauses 13 through 19 point to material in ISO/IEC 24739-3.

Part 3

Clause 1 describes the scope.

Clause 2 provides normative references for the entire standard.

Clause 3 provides definitions, abbreviations and conventions used within the entire standard.

Clauses 4, 5 and 6 point to the material in ISO/IEC 24739-1.

Clauses 7 through 12 point to the material in ISO/IEC 24739-2.

Clause 13 contains a general overview of the serial interface.

Clause 14 describes the serial physical layer.

Clause 15 describes the serial link layer.

Clause 16 describes the serial transport layer.

Clause 17 describes the device command layer protocol for the serial interface.

Clause 18 describes the host command layer protocol for the serial interface.

Clause 19 describes the serial interface host adapter register interface.

Clause 20 describes the serial interface error handling.

INFORMATION TECHNOLOGY – AT ATTACHMENT WITH PACKET INTERFACE-7 –

Part 1: Register delivered command set, logical register set (ATA/ATAPI-7 V1)

1 Scope

This part of ISO/IEC 24739 specifies the AT Attachment Interface between host systems and storage devices. It provides a common attachment interface for systems manufacturers, system integrators, software suppliers and suppliers of intelligent storage devices.

ISO/IEC 24739-1 defines the register delivered commands used by devices implementing the standard. ISO/IEC 24739-2 defines the connectors and cables for physical interconnection between host and storage device, the electrical and logical characteristics of the interconnecting signals and the protocols for the transporting of commands, data and status over the interface for the parallel interface. ISO/IEC 24739-3 defines the connectors and cables for physical interconnection between host and storage device, the electrical and logical characteristics of the interconnecting signals and the protocols for the transporting of commands, data and status over the interface for the serial interface. Figure 1 shows the relationship of these documents. For devices implementing the PACKET command feature set, additional command layer standards are listed in Table 1 and described in Clause 2.

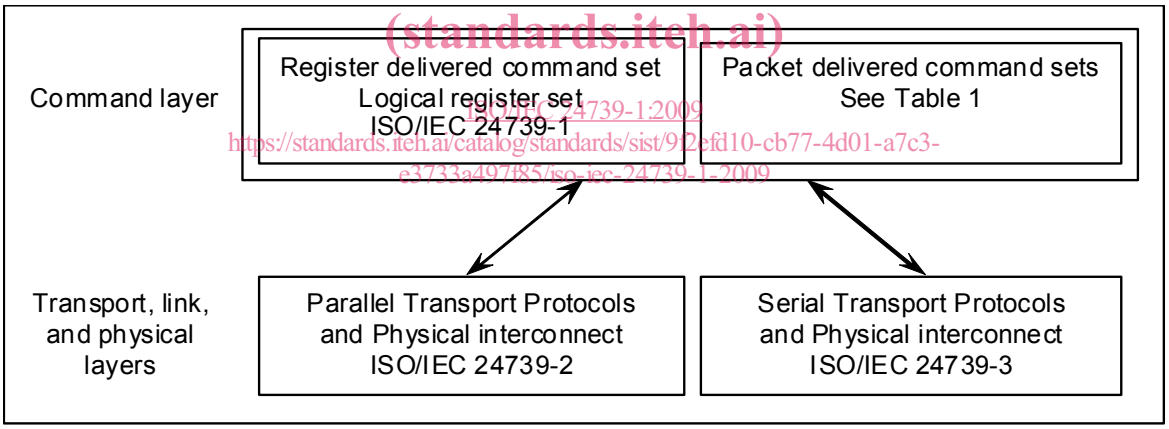

Figure 1 – ATA document relationships

Table 1 – PACKET delivered command sets

Standard
SCSI Primary Commands (SPC)
ISO/IEC 14776-452, SCSI Primary Commands 2 (SPC-2)
ISO/IEC 14776-453, SCSI Primary Commands-3 (SPC-3)
ISO/IEC 14776-322, SCSI Block Commands (SBC-2)
ISO/IEC 14776-331, SCSI Stream Commands (SSC)
Multimedia Commands (MMC)
ISO/IEC 14776-362, Multimedia Commands-2 (MMC-2)
ISO/IEC 14776-363, Multimedia Commands-3 (MMC-3)
ISO/IEC 14776-364: Multimedia Commands-4 (MMC-4)
ATAPI for Removable Media (SFF8070I)
ATA Packet Interface (ATAPI) for Streaming Tape QIC-157 revision D

This standard maintains compatibility with the AT Attachment with packet interface-6 standard (ATA/ATAPI-6), ANSI INCITS 361-2002, and while providing additional functions, is not intended to require changes to presently installed devices or existing software.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references only the edition cited applies. For undated references the latest edition (including any amendments) applies.

ISO/IEC 14776-321, *Information technology – Small computer system interface (SCSI-3) – Part 321: Block commands (SBC)* [ANSI INCITS 306-1998 (R2003)]

ISO/IEC 14776-322, *Information technology – Small computer system interface (SCSI) – Part 322: Block commands-2 (SBC-2)* [T10/1417-D]

ISO/IEC 14776-331, *Information technology – Small computer system interface (SCSI) – Part 331: Stream commands (SSC)* [ANSI INCITS 335-2000]

ISO/IEC 14776-362, *Information technology – Small computer system interface (SCSI) – Part 362: Multimedia commands-2 (MMC-2)* [ANSI INCITS 333-2000]

ISO/IEC 14776-363, *Information technology – Small computer system interface (SCSI) – Part 363: Multimedia commands-3 (MMC-3)* [ANSI INCITS 360-2002]
(under consideration)

ISO/IEC 14776-364, *Information technology – Small computer system interface (SCSI) – Part 364: Multimedia commands-4 (MMC-4)* [T10/1545D]
(under consideration)

ISO/IEC 14776-452, *Information technology – Small computer system interface (SCSI) – Part 452: Primary commands-2 (SPC-2)* *[ANSI INCITS 351-2001]*

ISO/IEC 14776-453, *Information technology – Small computer system interface (SCSI) – Part 453: Primary commands-3 (SPC-3)* [T10/1416-D]
(under consideration)

ISO/IEC 13213:1994, *Information technology – Microprocessor systems – Control and Status Register (CSR) Architecture for microprocessor buses*

ISO 7779:1999, *Acoustics – Measurement of airborne noise emitted by information technology and telecommunications equipment*

AT Attachment with Packet Interface Extension (ATA/ATAPI-4)[ANSI INCITS 317-1998] (R2003)

SCSI-3 Primary Commands (SPC) [ANSI INCITS 301-1997 (R2002)]

Multimedia Commands (MMC) [ANSI INCITS 304-1997 (R2002)]

Protected Area Run Time Interface Extensions (PARTIES) [ANSI INCITS 346-2001]

ATAPI for Rewritable Media (under development) [SFF8070i]

3 Definitions, abbreviations and conventions

3.1 Definitions and abbreviations

For the purposes of this standard, the following definitions apply.

3.1.1
ASCII Character
designates 8-bit value that is encoded using the ASCII character set

3.1.2
acoustics
measurement of airborne noise emitted by information technology and telecommunications equipment [see ISO 7779:1999(E)]

3.1.3
ATA (AT Attachment)
ATA defines the physical, electrical, transport and command protocols for the internal attachment of storage devices to host systems

3.1.4
ATA-1 device
device that complied with ANSI X3.221-1994, the AT Attachment interface for disk drives

NOTE ANSI X3.221-1994 has been withdrawn.

3.1.5
ATA-2 device
device that complied with ANSI X3.279-1996, the AT Attachment interface with extensions

NOTE ANSI X3.279-1996 has been withdrawn.

3.1.6
ATA-3 device
device that complies with ANSI INCITS 298-1997, the AT Attachment-3 Interface

NOTE ANSI INCITS 298-1997 has been withdrawn.

3.1.7
ATA/ATAPI-4 device
device that complies with ANSI INCITS 317-1998

NOTE For reference, see bibliography.