

ATAPI IMPLEMENTATION SPECIFICATION

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1 Current Objective

This version of the document is intended to give an overview of its use and purpose as well as a general form of the layout. Considerable work has been undertaken so far. However through use of earlier versions several problems have been found due to the diversity of information that is need to implement ATAPI drivers and qualify devices.

One practical problem is the content and presentation of the information the other is determining what has been implemented in the real world.

Because this document does not pretend to be a standard but a collecting and clarification point for a variety of standards it is intended to turn this into a technical report given T13's approval and after the appropriate procedures have been followed.

We would prefer to make this a public document as apposed to a private one used by a few organizations. By making it public it is hoped that in the fullness of time the interoperability of ATAPI implementations will improve by clarifying the diverse standards covered under the ATAPI umbrella. ATA has achieved this by providing a pragmatic standard that has continually been improved and rationalized.

The rest of this document is a skeleton of some of the aspects that will be covered.

The document is seen to be particularly useful to:

Software Driver Writers

Application Software Driver Writers

Customer Product Validation Engineers

Device Firmware Writers

2 Foreword

2.1 Background

The ATA Task File concept, defined in ATA/ATAPI-6, does not provide for enough bytes to support some of the command structures required for more complex command transmission, consequently the Packet command has been added to the ATA standard. Devices that implement this command are termed ATA Packet Interface (ATAPI) devices.

The physical, electrical and link layer protocols are fundamentally identical for both ATA and ATAPI devices. The definition of the physical, electrical and link layer protocols for both ATA and ATAPI devices are defined in the ATA/ATAPI-6 standard. ATA devices receive all their commands via the ATA task file and are termed register delivered commands. ATAPI devices implement some of the ATA register delivered commands as well as some register delivered commands peculiar to ATAPI devices. The majority of the register delivered commands implemented by ATAPI devices are concerned with configuring the device. These commands include the activation/deactivation of optional features as well as defining interface protocols and timings.

The ATA Packet command is a register delivered command that is only implemented on ATAPI devices. The purpose of the ATA Packet command is to deliver a packet of data to the device. This data packet defines the function that the device is to perform. This structure of the data within the packet is termed the Command Descriptor Block Packet (CDBP). The protocol used by an ATAPI device to deliver the CDBP by the ATA Packet command is defined in ATA/ATAPI-5.

The structure and meaning of the CDBP used in ATAPI devices have been derived from numerous SCSI, QIC and SFF documents. In many cases the variant of these commands used by the ATAPI device is a subset of the commands from which they were derived.

2.2 Objective

It is the objective of this document to consolidate all those commands into one document and at the same time removing superfluous information and clarifying the use of these commands in ATAPI devices. In addition a number of ATAPI Packet command sets are defined to clarify which commands should be used when implementing a device or option sets within a device.

Where CDBPs are derived from standards that were defined by a standards committee that is no longer active this report provides a forum for those commands to be maintained. Where CDBPs are derived from standards that are under the control of an active standards committee this report serves to document the CDBP into a standard ATAPI format.

2.3 Scope

The objective of this command set is to provide for the following:

- 1) A definition of the command formats and functions.
- 2) Standardized access to common Features of ATAPI devices.
- 3) System software/firmware independence across device classes. Thus, different tape drives, optical media drives, and other devices can be added to the system without requiring modifications to generic system hardware and software.
- 4) To provide compatibility such that properly conforming ATAPI devices may inter-operate with subsequent devices given that the system engineering is correctly done.
- 5) The report will include standard from various SCSI, QIC and SFF documents.

3 References

- 3.1 Primary references
- 3.2 Approved references
- 3.3 References under development
- 3.4 Other references

4 Definitions of Terms, Conventions and Keywords

- 4.1 Definitions of terms³
- 4.2 Conventions
 - 4.2.1 Error Code Tables
 - 4.2.2 Numbers
- 4.3 Keywords

5 General Description

- 5.1 IDENTIFY PACKET DEVICE Command
- 5.2 Resets
 - 5.2.1 Reset Usage
 - 5.2.2 Power On Reset
 - 5.2.3 Hard Reset
 - 5.2.4 SRST
 - 5.2.5 Device Reset
- 5.3 Deferred Error handling
- 5.4 Command Overlap Operation
- 5.5 ATA Compatibility
 - 5.5.1 Door Lock and Door Unlock vs. Prevent / Allow Medium Removal
 - 5.5.2 ATAPI Identify Drive vs. Inquiry
 - 5.5.3 ATAPI Device Reset
 - 5.5.4 Execute Drive Diagnostics
 - 5.5.5 ATAPI Identify Device
- 5.6 ATAPI Protocols

5.6.1 Determining the Device Type

The first task that a Host has to perform is to recognize the presence of an ATAPI device and then determine the type of ATAPI device. Once this has been determined the host can use the subset of ATAPI commands specific to that device. **THIS NEEDS QUITE A BIT OF WORK.**

5.6.2 ATAPI Transfer Protocol

5.6.3 Command Sequence

6 CDBP Command Sets.

This section will define device functionality and the sets of CDBPs used by those functions. It will perform a similar function to Section 6 in ATA/ATAPI-6.

7 CDBP Definitions

Each CDBP will be defined including the ATA/ATAPI register usage as well as the appropriate CDBP data structure and content. Register content on completion (both normal and error) will be defined including the use of Sense keys.

- Annex A Additional Sense Codes for CD (normative)**
- Annex B CD-TEXT Format in the Lead-in Area (normative)**
- Annex C Mode Pages and Parameters (normative)**