Universal Serial Bus
Mass Storage Class
Specification Overview

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Technical Editors

Mark Williams  Microsoft Corporation

Contributors

Toyoko Shimizu  Y-E Data, Inc.
Jim Blackson  Y-E Data, Inc.
Hiromichi Oribe  Hagiwara Sys-Com Co Ltd.
Darrell Redford  Iomega Corporation
Glen Slick  Microsoft Corporation
Dave Gilbert  In-System Design
David Luke  In-System Design
Bill Stanley  Adaptec
Shing F. Lin  Adaptec
Alex Afshar  Matsushita Semiconductor
James Quigley  Iomega Corporation
Mike Poulsen  Iomega Corporation
David Jolley  Iomega Corporation
Curtis Stevens  Phoenix Technologies
Al Rickey  Phoenix Technologies
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1. Introduction

This document gives an overview of the USB Mass Storage Class specifications. How mass storage devices behave on the USB bus is the subject of this and other USB Mass Storage Class specifications. At this time, four other USB Mass Storage Class specifications are under development by the USB Mass Storage Class Working Group (CWG). The titles of these specifications are:

USB Mass Storage Class Control/Bulk/Interrupt (CBI) Transport
USB Mass Storage Class Bulk-Only Transport
USB Mass Storage Class Bootability
USB Mass Storage Class UFI Command Specification

Note: At this time, the USB Mass Storage Class Control/Bulk/Interrupt (CBI) Transport, v1.0, RC5 specification is available for review at http://www.usb.org/dwgdocs. The USB Mass Storage Class Bulk-Only Transport, v0.9 specification is available for review at http://www.usb.org/dwgdocs. The Bootability specification is at v0.6 and therefore not posted on the Web. The USB Mass Storage Class UFI Command Specification v0.8 is available for review at http://www.usb.org/dwgdocs.

1.1 Target Audience

The CBI and Bulk-Only specifications are each intended to be stand-alone documents for the USB Mass Storage class, enabling development of a USB Mass Storage compliant device. A device manufacturer may choose to implement both CBI and Bulk-Only, but shall follow each specification as applicable.

1.2 The Bootability specification is considered an enhancement to either the CBI or Bulk-Only specifications. Devices may be CBI only, Bulk-Only, and not be Bootable. However, to be bootable, the device must comply with the Bootability specification, as well as the CBI specification or the Bulk-Only specification or both.

Purpose

The purpose of this document is to provide an overview of all the specifications that describe how mass storage devices behave on the USB bus. Section 1.1, which purposefully uses the terms “may” and “shall”, does have the weight of a specification. That section gives the rules for using the different USB Mass Storage class specifications.

Note that these rules can change. As other companies, with different USB Mass Storage Class device projects in mind, join the USB Mass Storage Class CWG, other specifications may be developed by the CWG and added to the set of specifications that fully describe how a Mass Storage Class device behaves on the USB bus. If and when that happens, the USB Mass Storage CWG will reconsider the rules specified in section 1.1 of this document.

1.3 Terms and Abbreviations

May

A keyword that indicates an option.

Shall

A keyword that indicates a requirement.

1.4 Related Documents

USB Mass Storage specifications use the command sets from several existing protocols. The command blocks of these command sets are placed in a USB wrapper and follow USB protocol. The following specifications are referenced by the USB Mass Storage specifications:
2. Subclass Code

The Interface Descriptor of a USB Mass Storage Class device includes a \texttt{bInterfaceSubClass} field. This field denotes the command block set used by this interface. The value of the \texttt{bInterfaceSubClass} field shall be set to one of the Subclass codes as shown in the following table.

Note that the Subclass code values used in the \texttt{bInterfaceSubClass} field specify the industry-standard specification that describes the command block definition used by the interface; these Subclass codes do not specify a type of storage device (such as a CD-ROM or floppy disk drive).


Table 2.1 – SubClass Codes Mapped to Command Block Specifications

<table>
<thead>
<tr>
<th>SubClass Code</th>
<th>Command Block Specification</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>01h</td>
<td>Reduced Block Commands (RBC) T10 Project 1240-D</td>
<td>Typically, a Flash device uses RBC command blocks. However, any Mass Storage device can use RBC command blocks.</td>
</tr>
<tr>
<td>02h</td>
<td>SFF8020I</td>
<td>Typically, a CD-ROM device uses SFF8020I command blocks for its Mass Storage interface. However, a CD-ROM device can be in another subclass (for example, RBC) and other types of storage devices can belong to the SFF8020I subclass.</td>
</tr>
<tr>
<td>03h</td>
<td>QIC-157</td>
<td>Typically, a tape device uses QIC-157 command blocks.</td>
</tr>
<tr>
<td>04h</td>
<td>UFI</td>
<td>Typically a floppy disk drive (FDD) device</td>
</tr>
<tr>
<td>05h</td>
<td>SFF8070I</td>
<td>Typically, a floppy disk drive (FDD) device uses SFF8070I command blocks. However, an FDD device can be in another subclass (for example, RBC) and other types of storage devices can belong to the SFF8070I subclass.</td>
</tr>
<tr>
<td>06h</td>
<td>SCSI transparent command set</td>
<td></td>
</tr>
<tr>
<td>07h – FFh</td>
<td>Reserved for future use.</td>
<td></td>
</tr>
</tbody>
</table>

3. Protocol Code

The Interface Descriptor of a USB Mass Storage Class device includes a `bInterfaceProtocol` field. This field denotes the transport protocol used by this interface.
<table>
<thead>
<tr>
<th>bInterface Protocol</th>
<th>Protocol Implementation</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>00h</td>
<td>Control/Bulk/Interrupt protocol with command completion interrupt</td>
<td>USB Mass Storage Class Control/Bulk/Interrupt (CBI) Transport</td>
</tr>
<tr>
<td>01h</td>
<td>Control/Bulk/Interrupt protocol with no command completion interrupt</td>
<td>USB Mass Storage Class Control/Bulk/Interrupt (CBI) Transport</td>
</tr>
<tr>
<td>TBD</td>
<td>Bulk Only Transport</td>
<td>USB Mass Storage Class Bulk-Only Transport</td>
</tr>
<tr>
<td>02h - FFh</td>
<td>Reserved</td>
<td></td>
</tr>
</tbody>
</table>