

JEDEC STANDARD

Universal Flash Storage (UFS) File Based Optimizations (FBO) Extension

Version 1.0

JESD231

AUGUST 2022

JEDEC SOLID STATE TECHNOLOGY ASSOCIATION



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Published by
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UFS FBO (FILE BASED OPTIMIZATION) EXTENSION, VERSION 1.0

Foreword

This standard has been prepared by JEDEC. The purpose of this standard is to define a UFS File Based Optimization (FBO) Extension specification. This document is extension of the UFS Standard, JESDxxx.

Introduction

The UFS device is a universal data storage and communication media. It is designed to cover a wide area of applications as smart phones, VR(virtual reality) device, AR(augmented reality) device, Drone, 3D games, surveillance system, cameras, organizers, PDAs, digital recorders, MP3 players, internet tablets, electronic toys, etc.

This extension specification describes the File Based Optimization (FBO) feature for UFS to improve device performance by utilizing file base information which is transferred to the device.

UFS FBO (FILE BASED OPTIMIZATION), VERSION 1.0

(From JEDEC Board Ballot JCB-22-10, formulated under the cognizance of the JC-64.1 Subcommittee on Electrical Specifications and Command Protocols (Item 139.54).)

1 SCOPE

This standard specifies the extension specification of the UFS electrical interface and the memory device. This document describes the extended feature, called File Based Optimization (FBO), in UFS specification. It also provides some details in how to utilize the FBO for gaining higher performance in UFS devices.

2 NORMATIVE REFERENCE

The following normative documents contain provisions that, through reference in this text, constitute provisions of this standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents listed. For undated references, the latest edition of the normative document referred to applies.

[UFS], JEDEC JESD220D, Universal Flash Storage (UFS), Version 3.1

3 TERMS, AND DEFINITIONS

For the purpose of this standard, the terms and definitions given in the documents included in section 2 “Normative Reference” and the following apply.

3.1 Acronyms

FBO	File Based Optimization
HCI	Host Controller Interface
UFS	Universal Flash Storage
MIPI	Mobile Industry Processor Interface
RPMB	Replay Protected Memory Block
SBC	SCSI Block Commands
SPC	SCSI Primary Commands
LUN	Logical Unit Number
NA	Not applicable
KB	Kilobyte
eUFS	Embedded Universal Flash Storage
LBA	Logical Block Address

3.2 Terms and definitions

Byte: An 8-bit data value with most significant bit labeled as bit 7 and least significant bit as bit 0.

Device: An addressable device on the UFS bus usually a target that contains at least one LUN

Host: An addressable device on the UFS bus which is usually the main CPU that hosts the UFS bus

3.3 Keywords

Several keywords are used to differentiate levels of requirements and options, as follow:

Can: A keyword used for statements of possibility and capability, whether material, physical, or causal (*can equals is able to*).

Expected: A keyword used to describe the behavior of the hardware or software in the design models assumed by this standard. Other hardware and software design models may also be implemented.

Ignored: A keyword that describes bits, bytes, quadlets, or fields whose values are not checked by the recipient.

Mandatory: A keyword that indicates items required to be implemented as defined by this standard.

May: A keyword that indicates a course of action permissible within the limits of the standard (*may equals is permitted*).

Must: The use of the word *must* is deprecated and shall not be used when stating mandatory requirements; *must* is used only to describe unavoidable situations.

Optional: A keyword that describes features which are not required to be implemented by this standard. However, if any optional feature defined by the standard is implemented, it shall be implemented as defined by the standard.

Reserved: A keyword used to describe objects—bits, bytes, and fields—or the code values assigned to these objects in cases where either the object or the code value is set aside for future standardization. Usage and interpretation may be specified by future extensions to this or other standards. A reserved object shall be zeroed or, upon development of a future standard, set to a value specified by such a standard. The recipient of a reserved object shall not check its value. The recipient of a defined object shall check its value and reject reserved code values.

Shall: A keyword that indicates a mandatory requirement strictly to be followed in order to conform to the standard and from which no deviation is permitted (*shall equals is required to*). Designers are required to implement all such mandatory requirements to assure interoperability with other products conforming to this standard.

Should: A keyword used to indicate that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others; or that a certain course of action is preferred but not necessarily required; or that (in the negative form) a certain course of action is deprecated but not prohibited (*should equals is recommended that*).

Will: The use of the word *will* is deprecated and shall not be used when stating mandatory requirements; *will* is only used in statements of fact.