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Compute Project

**Storage:  
Storage device with Ethernet  
interface**

Rev 2

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# 1 Scope

This specification defines the technical requirements for the storage device with Ethernet interface.

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## 3 Overview

### 3.1 Description

The storage device with Ethernet interface provides a common configuration for the implementation of the Ethernet interface on a storage device. It is intended to support large configurations of storage devices in data center applications. Other applications may find the features of this device advantageous where communication to the device through the Ethernet interface is desired.

Some example implementations are documented in <Reference to the white paper>.

### 3.2 License

As of December 20, 2013, the following persons or entities have made this Specification available under the Open Web Foundation Final Specification Agreement (OWFa 1.0), which is available at <http://www.openwebfoundation.org/legal/the-owf-1-0-agreements/owfa-1-0>:

Seagate Technology LLC

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## 4 Normative references

Referenced standards and specifications contain provisions that, by reference in the text, constitute provisions of this specification.

*I<sup>2</sup>C-bus specification and user manual*, Rev. 5 — 9 October 2012  
*Serial-GMII Specification*  
RFC 2119, *RFC Key Words*  
SFF-8201, *2.5" Drive Form Factor Drive Dimensions*  
SFF-8301, *3.5" Drive Form Factor Drive Dimensions*  
SFF-8223, *2.5" Drive Form Factor with Serial Connector*  
SFF-8323, *3.5" Drive Form Factor with Serial Connector*  
SFF-8482, *Serial Attachment 2X Unshielded Connector*  
SFF-8680, *Serial Attachment 12 Gb/s 2X Unshielded Connector*  
SFF-9639, *Multifunction 12 Gb/s 6X Unshielded Connector Pinouts*

## 5 Definitions, symbols, abbreviations, key words

### 5.1 Definitions

### 5.2 Symbols and abbreviations

<b>Abbreviation</b>	<b>Meaning</b>
GPIO	general purpose input/output
I <sup>2</sup> C	Inter-Integrated Circuit
mA	milliampere (i.e., 10 <sup>-3</sup> amperes)
RX	Receiver
TX	Transmitter
V	Volt

### 5.3 Key words

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC 2119.

**MAY** This word, or the adjective "OPTIONAL", mean that an item is truly optional. One vendor may choose to include the item because a particular marketplace requires it or because the vendor feels that it enhances the product while another vendor may omit the same item. An implementation which does not include a particular option **MUST** be prepared to interoperate with another implementation which does include the option, though perhaps with reduced functionality. In the same vein an implementation which does include a particular option **MUST** be prepared to interoperate with another implementation which does not include the option (except, of course, for the feature the option provides.)

**MUST** This word, or the terms "REQUIRED" or "SHALL", mean that the definition is an absolute requirement of the specification.

**MUST NOT** This phrase, or the phrase "SHALL NOT", mean that the definition is an absolute prohibition of the specification.

**SHOULD** This word, or the adjective "RECOMMENDED", mean that there may exist valid reasons in particular circumstances to ignore a particular item, but the full implications must be understood and carefully weighed before choosing a different course.

**SHOULD NOT** This phrase, or the phrase "NOT RECOMMENDED" mean that there may exist valid reasons in particular circumstances when the particular behavior is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behavior described with this label.

**VENDOR SPECIFIC** Something (e.g., a bit, field, code value) that is not defined by this specification and **MAY** be used differently in various implementations.

## 5.4 Editorial conventions

Certain words and terms used in this specification have a specific meaning beyond the normal English meaning. These words and terms are defined either in the glossary or in the text where they first appear.

Lists sequenced by lowercase or uppercase letters show no ordering relationship between the listed items.

Lists sequenced by numbers show an ordering relationship between the listed items.

If a conflict arises between text, tables, or figures, the order of precedence to resolve the conflicts is text; then tables; and finally figures. Not all tables or figures are fully described in the text. Tables show data format and values. Notes and examples do not constitute any requirements for implementers and notes are numbered consecutively throughout this specification.

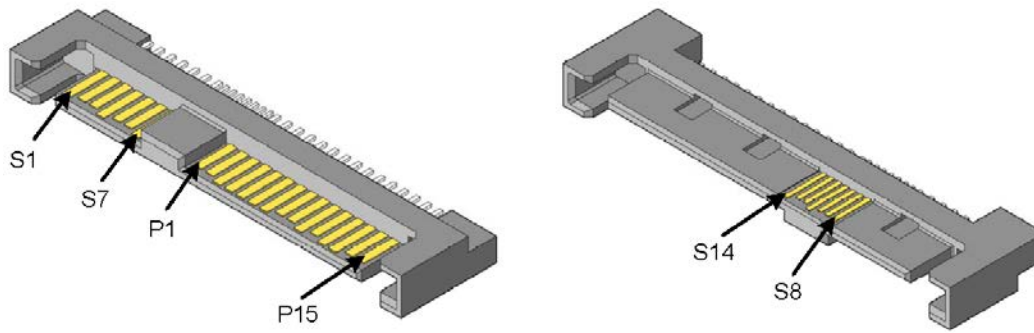
# 6 Mechanical characteristics

## 6.1 Device and system connectors

### 6.1.1 Storage device connector

The storage device with Ethernet interface plug connector is the Device Free (Plug) connector defined in SFF-8482 and SFF-8680. See the SFF specifications for detailed dimensional requirements.

Figure 1 illustrates the interface plug connector.

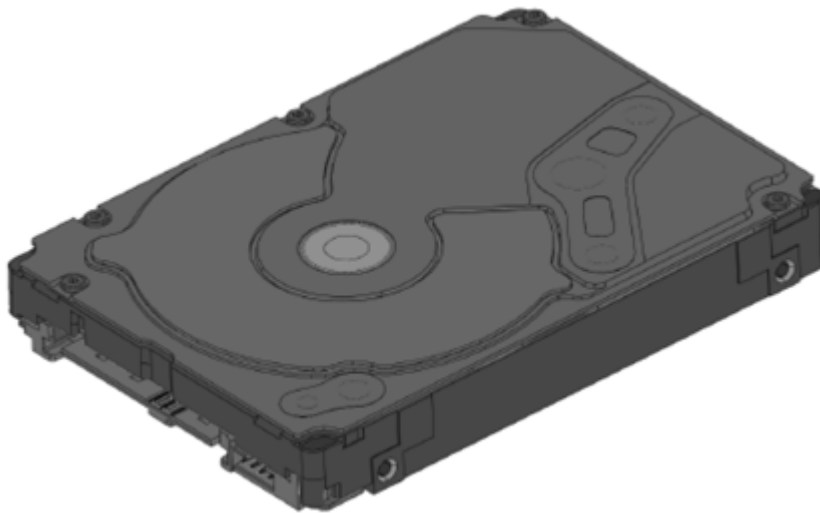


**Figure 1 Device Free (Plug) connector**

### 6.1.2 Device form factor and connector location

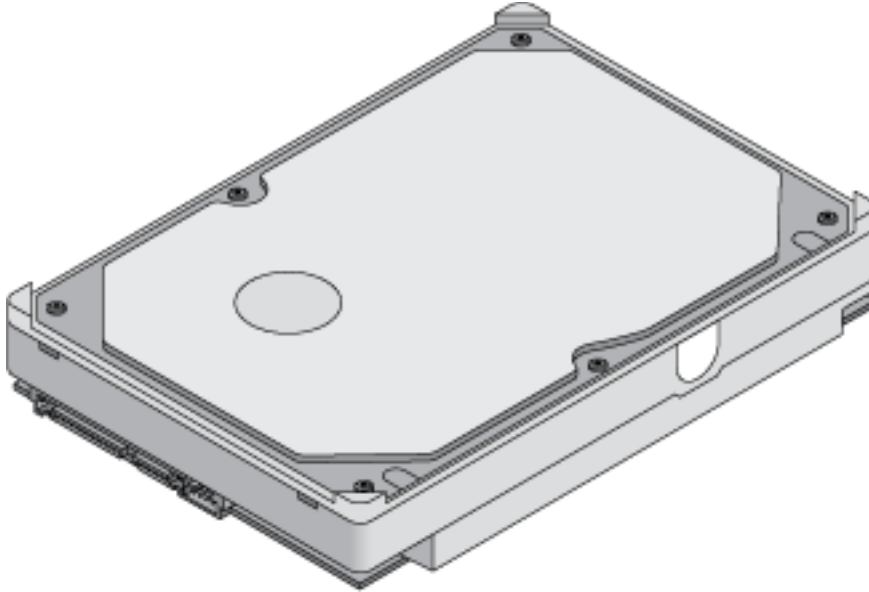
The storage device with Ethernet interface form factor SHALL comply with SFF-8201 or SFF-8301 (2.5" and 3.5" drive form factors, respectively).

See SFF-8223 and SFF-8323 for the storage device with Ethernet interface plug connector locations on 2.5" and 3.5" drive form factors, respectively. These SFF specifications define the location of the connector relative to the device side mounting holes and the device bottom mounting holes, as applicable. Figure 2 illustrates the connector on a 2.5" hard disk drive. The connector location on the storage device with Ethernet interface SHALL comply with the applicable SFF specification.



**Figure 2 2.5" hard disk drive with Ethernet interface plug connector**

Figure 3 illustrates the connector on a 3.5" hard disk drive.

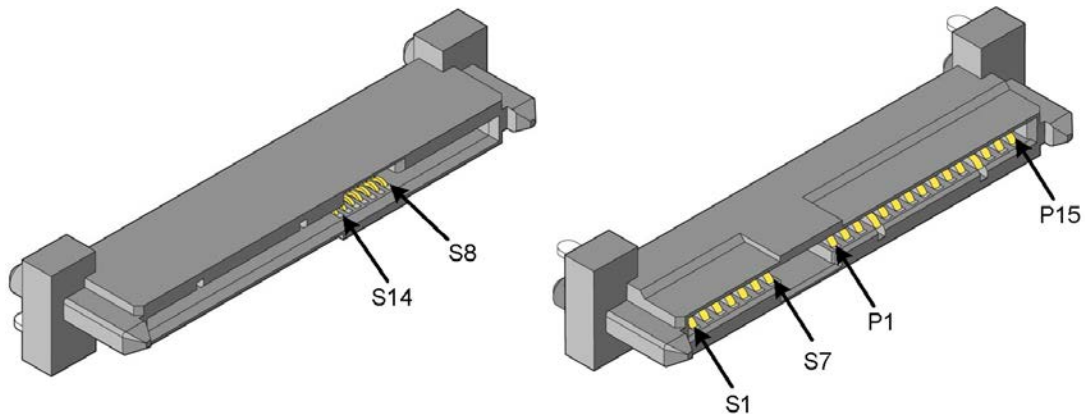


**Figure 3 3.5” hard disk drive with Ethernet interface plug connector**

### 6.1.3 System connector

The system backplane receptacle connector is the Backplane Fixed (Receptacle) connector defined in SFF-8482 and SFF-8680. The backplane receptacle connector defined by SFF-8639 may also be used.

Figure 4 illustrates the SFF-8482/SFF-8680 system Fixed (Receptacle) connector.



**Figure 4 System Backplane Fixed (Receptacle) connector**

### 6.1.4 Connector pin assignment

Table 1 defines the system and device connector pin signal assignments. The storage device with Ethernet interface SHALL comply with this pin assignment. Other interfaces use common form factors and connectors that may physically mate with the device or system connector used in the storage device with Ethernet interface. See SFF-9639 for a list of these interfaces and pin signal assignments.

**Table 1 Connector signal assignments**

Segment	Pin	Backplane receptacle	Device plug
Signal	S1	GROUND	GROUND
	S2	TX0+	RX0+
	S3	TX0-	RX0-
	S4	GROUND	GROUND
	S5	RX0-	TX0-
	S6	RX0+	TX0+
	S7	GROUND	GROUND
	S8	GROUND	GROUND
	S9	TX1+	RX1+
	S10	TX1-	RX1-
	S11	GROUND	GROUND
	S12	RX1-	TX1-
	S13	RX1+	TX1+
	S14	GROUND	GROUND
Power	P1	Vendor specific	Vendor specific
	P2	I <sup>2</sup> C CLOCK	I <sup>2</sup> C CLOCK
	P3	I <sup>2</sup> C DATA	I <sup>2</sup> C DATA
	P4	GROUND	GROUND
	P5	GROUND	GROUND
	P6	GROUND	GROUND
	P7	+5V PRECHARGE	+5V PRECHARGE
	P8	+5V	+5V
	P9	+5V	+5V
	P10	GROUND	GROUND
	P11	Vendor specific	Vendor specific
	P12	GROUND	GROUND
	P13	+12V PRECHARGE	+12V PRECHARGE
	P14	+12V	+12V
	P15	+12V	+12V

1. See 7.1 for TX and RX electrical characteristics..
2. See 7.2 for I<sup>2</sup>C electrical characteristics.
3. See 7.3 for +5V and +12V requirements.
4. See 7.4 for P1 and P11 electrical characteristics.



## 7 Electrical characteristics

### 7.1 TX and RX signals

The TX and RX signals SHALL meet the requirements defined by the *Serial-GMII Specification*. This specification may be obtained at

<ftp://ftp-eng.cisco.com/smii/sgmii.pdf>

### 7.2 I<sup>2</sup>C signals

The I<sup>2</sup>C signals are OPTIONAL. If implemented, the I<sup>2</sup>C signals SHALL comply with the *I<sup>2</sup>C-bus specification and user manual*, Standard-mode. A pull up to 3.3V is located on the device. This specification and user manual may be obtained at

[www.nxp.com/documents/user\\_manual/UM10204.pdf](http://www.nxp.com/documents/user_manual/UM10204.pdf).

### 7.3 +5V and +12V

The storage device with Ethernet interface may require +5V, +12V, or both +5V and +12V. See the device product data sheet for specific voltage and power requirements.

### 7.4 P1 and P11

Applications of P1 and P11 are VENDOR SPECIFIC. These pins may be not connected or the device may connect a GPIO with the following electrical characteristic limits:

Maximum voltage applied to device by chassis: 3.6 V

Minimum device sink current capability: 8 mA