SFF Committee

SFF-8500

Specification for

Suite of 5.25" Form Factor Specifications

Standardized as EIA-741 at Rev 1.1 June 5, 1995

This specification was developed by the SFF Committee prior to it becoming the SFF TA (Technology Affiliate) TWG (Technical Working Group) of SNIA (Storage Networking Industry Association).

The information below should be used instead of the equivalent herein.

POINTS OF CONTACT:

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Email: SFF-Chair@snia.org

If you are interested in participating in the activities of the SFF TWG, the membership application can be found at:
http://www.snia.org/sff/join

The complete list of SFF Specifications which have been completed or are currently being worked on can be found at:
http://www.snia.org/sff/specifications/SFF-8000.TXT

The operations which complement the SNIA's TWG Policies & Procedures to guide the SFF TWG can be found at:
http://www.snia.org/sff/specifications/SFF-8032.PDF

Suggestions for improvement of this specification will be welcome, they should be submitted to:
http://www.snia.org/feedback
SFF Committee documentation may be purchased (see p4).  
SFF Committee documents are available by FaxAccess at 408-741-1600

SFF Committee

SFF-8500 Specification for
Suite of 5.25" Form Factor Specifications

Rev 1.1 June 5, 1995

Secretariat: SFF Committee

Abstract: This document contains the many SFF specifications related to 5.25" form factor devices, which are utilized in a wide variety of cabled and direct attach environments. Specifications which are available individually are included here in a comprehensive set.

This document provides a common specification for systems manufacturers, system integrators, and suppliers of storage devices. This is an internal working document of the SFF Committee, an industry ad hoc group.

This document is made available for public review, and written comments are solicited from readers. Comments received by the members will be considered for inclusion in future revisions of this document.

Support: This document is supported by the identified member companies of the SFF Committee.

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Date of Printing: March 30, 1996
EXPRESSRON OF SUPPORT BY MANUFACTURERS

This document contains all the Specifications in the suite of projects.

The expression of support on this page indicates support of this specification only, even though the following pages include other specifications.

The title line and footer change by page to indicate which specification, and its present status (Development, Published, etc). The information on support for individual Specifications is provided at the beginning of each.

The following member companies of the SFF Committee voted in favor of this industry specification.

AMP
DEC
ENDL
IBM
Maxtor
Methode
Quantum
Robinson Nugent
Seagate

To save space for SFF Specifications being reviewed, the information on the principles of the SFF Committee and how to join has not been printed.
TABLE OF CONTENTS

1. Scope 4
   1.1 Description of Clauses 4

2. References 4
   2.1 Industry Documents 4
   2.2 SFF Specifications 5
   2.3 Sources 6

3. General Description 7

4. Definitions and Conventions 7
   4.1 Definitions 7
   4.2 Conventions 7

5. 5.25" Physical Configuration 9
   5.1 Connectors 9
   5.2 Mounting Considerations 9
   5.3 Physical Dimensions 9

6. 5.25" Magnetic Disk Drives Form Factors 11

7. Location of Cabled Connectors on ATAPI CD-ROMs 14

8. Form Factor of 5.25" CD-ROMs 15

FIGURES

FIGURE 6-1 FORM FACTOR OF 5.25" DISK DRIVE 12
FIGURE 7-1 CONNECTORS MOUNTED ON TOP OF PCB 14
FIGURE 7-2 CONNECTORS MOUNTED ON BOTTOM OF PCB 14

TABLES

TABLE 6-1 5.25" DISK DRIVE DIMENSIONS 11
1. Scope

The 85xx suite of specifications defines the configuration characteristics associated with 5.25" drives.

The purpose of the 85xx suite is to define the external characteristics of drives such that products from different vendors may be used in the same mounting configurations.

The set of specifications provide external dimensions, connectors, connector placement, mounting holes and interface pinouts to assist manufacturers in the systems integration of small form factor disk drives.

- SFF-8500 contains general information regarding connector space, mounting considerations and measurement requirements.
- SFF-8501 defines the dimensions of 5.25" disk drives.
- Other specifications in the 85xx family define the location of connectors on 5.25" drives.

In an effort to broaden the applications for storage products, an ad hoc industry group of companies representing system integrators, peripheral suppliers, and component suppliers decided to address issues which appear in the marketplace that affect many OEMs and vendors.

The SFF Committee was formed in August, 1990 and the first working document was introduced in January, 1991.

1.1 Description of Clauses

Clause 1 contains the Scope and Purpose.

Clause 2 contains Referenced and Related Standards and SFF Specifications.

Clause 3 contains the General Description.

Clause 4 contains the Glossary.

Clause 5 and successive Clauses (if any) contain detailed characteristics.

2. References

The SFF Committee activities support the requirements of the storage industry, and it is involved with several standards.

2.1 Industry Documents

The following interface standards are relevant to many SFF Specifications.

- X3.131R-1994    SCSI-2 Small Computer System Interface
- X3T9.2/0855    SPI (SCSI-3 Parallel Interface)
- X3.221-199x    ATA (AT Attachment)
- X3T10/0948    ATA-2 (ATA Extensions)
2.2 SFF Specifications

There are several projects active within the SFF Committee. At the date of printing document numbers had been assigned to the following projects. The status of Specifications is dependent on committee activities.

F = Forwarded   The document has been approved by the members for forwarding to a formal standards body.
P = Published   The document has been balloted by members and is available as a published SFF Specification.
A = Approved   The document has been approved by ballot of the members and is in preparation as an SFF Specification.
C = Canceled   The project was canceled, and no Specification was Published.
D = Development The document is under development at SFF.
E = Expired     The document has been published as an SFF Specification, and the members voted against re-publishing it when it came up for annual review.
i = Information The document has no SFF project activity in progress, but it defines features in developing industry standards. The document was provided by a company, editor of an accredited standard in development, or an individual. It is provided for broad review (comments to the author are encouraged).
s = submitted   The document is a proposal to the members for consideration to become an SFF Specification.

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Suite of 5.25" Form Factor Specifications
SFF-8030 1.7 SFF Committee Charter
SFF-8031 Named Representatives of SFF Committee Members
SFF-8032 1.2 SFF Committee Principles of Operation
SFF-8033i 1.0 Improved ATA Timing Extensions to 16.6 MBs
SFF-8034i 3.0 High Speed Local Bus ATA Line Termination Issues
SFF-8035i 1.0 Self-Monitoring, Analysis and Reporting Technology
SFF-8036i 1.1 ATA Signal Integrity Issues
SFF-8037i 1.0 Intel Small PCI SIG
SFF-8038i 1.0 Intel Bus Master IDE ATA Specification
SFF-8039i 1.1 Phoenix EDD (Enhanced Disk Drive) Specification
SFF-8040 1.2 25-pin Asynchronous SCSI External Connector
SFF-8041 C SCA-2 Connector Backend Configurations
SFF-8042 C VHDCI Connector Backend Configurations
SFF-8045 3.4 40-pin SCA-2 Connector w/Parallel Selection
SFF-8046 2.4 80-pin SCA-2 Connector for SCSI Disk Drives
SFF-8047 C 40-pin SCA-2 Connector w/Serial Selection
SFF-8048 C 80-pin SCA-2 Connector w/Parallel ESI
SFF-8050 1.0 Bootable CD-ROM
SFF-8055i SMART Application Guide for ATA Interface
SFF-8065 C 40-pin SCA-2 Connector w/High Voltage
SFF-8066 C 80-pin SCA-2 Connector w/High Voltage
SFF-8067 1.3 40-pin SCA-2 Connector w/Bidirectional ESI
SFF-8080 1.0 Fax-Access Instructions
SFF-8200 1.1 2 1/2" drive form factors (all of 82xx family)
SFF-8201 1.2 2 1/2" drive form factor dimensions
SFF-8212 1.2 2 1/2" drive w/SFF-8001 44-pin ATA Connector
SFF-8300 1.1 3 1/2" drive form factors (all of 83xx family)
SFF-8301 1.2 3 1/2" drive form factor dimensions
SFF-8302 1.1 3 1/2" Cabled Connector locations
SFF-8332 1.2 3 1/2" drive w/80-pin SFF-8015 SCA Connector
SFF-8337 1.2 3 1/2" drive w/SCA-2 Connector
SFF-8342 1.3 3 1/2" drive w/Serial Unitized Connector
SFF-8400 0.1 Very High Density Cable Interconnect
SFF-8441 3.0 VHDCI Shielded Configurations
SFF-8500 1.1 5 1/4" drive form factors (all of 85xx family)
SFF-8501 1.1 5 1/4" drive form factor dimensions
SFF-8508 1.1 5 1/4" ATAPI CD-ROM w/audio connectors
SFF-8551 1.2 5 1/4" CD-ROM 1" High form factor

2.3 Sources

Copies of ANSI standards or proposed ANSI standards may be purchased from Global Engineering.

15 Inverness Way East 800-854-7179 or 303-792-2181
Englewood 303-792-2192Fx
CO 80112-5704
Copies of SFF Specifications are available by FaxAccess or by joining the SFF Committee as an Observer or Member.

FaxAccess is a computer-operated service capable of faxing copies of documents selected from a menu. Anyone ordering documents over FaxAccess must be using the handset of a fax machine, as the documents are transmitted over the same line as the caller dialed in on to make the selection(s).

3. General Description

The application environment for small form factor disks is any computer connecting to one or more disks in a restricted packaging environment.

The purpose of an SFF Specification is to provide information that will assist vendors to design products that can fit the same packaging envelope.

Small form factor disks are widely-used where low power and small size are important configuration parameters.

4. Definitions and Conventions

4.1 Definitions

For the purpose of SFF Specifications, the following definitions apply:

4.1.1 ATA (AT Attachment): This term defines the signal and logical protocol described in X3.221 for IDE (Integrated Drive Electronics) peripherals.

4.1.2 IDE (Integrated Drive Electronics): IDE describes a device with built in ATA protocol electronics.

4.1.3 Optional: This term describes features which are not required by the SFF Specification. However, if any feature defined by the SFF Specification is implemented, it shall be done in the same way as defined by the Specification. Describing a feature as optional in the text is done to assist the reader. If there is a conflict between text and tables on a feature described as optional, the table shall be accepted as being correct.

4.1.4 Reserved: Where this term is used for bits, bytes, fields and code values; the bits, bytes, fields and code values are set aside for future standardization. The default value shall be zero. The originator is required to define a Reserved field or bit as zero, but the receiver should not check Reserved fields or bits for zero.

4.1.5 VU (Vendor Unique): This term is used to describe bits, bytes, fields, pins, signals, code values and features which are not described in this SFF Specification, and may be used in a way that varies between vendors.

4.1.6 VU Mode: A mode of execution by the drive in which its use is not defined by this SFF Specification. The means by which a vendor invokes vendor unique operations within a drive is defined by this SFF Specification.
4.2 Conventions

Certain terms used herein are the proper names of signals. These are printed in uppercase to avoid possible confusion with other uses of the same words; e.g., ATTENTION. Any lower-case uses of these words have the normal American-English meaning.

A number of conditions, commands, sequence parameters, events, English text, states or similar terms are printed with the first letter of each word in uppercase and the rest lower-case; e.g., In, Out, Request Status. Any lower-case uses of these words have the normal American-English meaning.

The American convention of numbering is used i.e., the thousands and higher multiples are separated by a comma and a period is used as the decimal point. This is equivalent to the ISO convention of a space and comma.

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<td>1 323 462,9</td>
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5. 5.25" Physical Configuration

5.1 Connectors

There are several connector choices that can be used with 5.25" disk drives, both for cabled environments and direct attachment to a backplane.

A clear out zone inside the drive form factor provides room for the system connector.

5.2 Mounting Considerations

Except at the attachment points, 0.75mm clearance around the drive is recommended for cooling airflow. Requirements of additional clearance and/or minimum airflow is vendor specific.

5.3 Physical Dimensions

SFF-8501 defines general drive dimensional information which applies to magnetic disk drives.

SFF-8551 defines general drive dimensional information which applies to optical CD-ROM drives.

The drive shall be measured at 20 +/- 2 degrees C.

The drive shall not be exposed to any conditions (transit temperatures, shock, etc.) beyond the manufacturer's specified limits before measurement.
EXPRESSION OF SUPPORT BY MANUFACTURERS

The following member companies of the SFF Committee voted in favor of this industry specification.

3M
Adaptec
AMP
Cirrus Logic
ENDL
Honda Connector
IBM
Madison Cable
Maxtor
Methode
Quantum
Robinson Nugent
Seagate
Sigmax

The following member companies of the SFF Committee voted to forward this industry specification to an accredited standards body.

Methode
6. 5.25" Magnetic Disk Drives Form Factors

This specification defines the configuration characteristics associated with 5.25" magnetic disk drives.

Table 6-1 defines the dimensions of the drive represented in Figure 6-1. References offset to the left in the dimensions column are variables, and those to the right are tolerances.

EDITORS NOTE: The figure needs to be modified to be in line with SFF labeling practices i.e. labeling Different heights as A1 and A2 and A3 deviates from SFF Style because the table clearly shows that A1 is a variable. If the other dimensions are renamed, the table will be adjusted accordingly.

<table>
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<tr>
<th>Dimension</th>
<th>Millimeters</th>
<th>Inches</th>
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<td>3.250 *</td>
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<td>A 1</td>
<td>*</td>
<td>.000 *</td>
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<tr>
<td>A 1</td>
<td>*</td>
<td>.000 *</td>
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* = maximum

NOTE: Tolerances are +/-0.25mm (0.010").
In Specifications under review, the figures are not integrated with the text but follow behind its transmittal. Space has been left here so the figure can be pasted in the proper position.

FIGURE 6-1  FORM FACTOR OF 5.25" DISK DRIVE
EXPRESSION OF SUPPORT BY MANUFACTURERS

The following member companies of the SFF Committee voted in favor of this industry specification.

3M
Adaptec
AMP
Cirrus Logic
ENDL
Honda Connector
IBM
Madison Cable
Maxtor
Methode
Quantum
Robinson Nugent
Sigmax
Western Digital

The following member companies of the SFF Committee voted to forward this industry specification to an accredited standards body.

Methode
7. Location of Cabled Connectors on ATAPI CD-ROMs

This specification defines the configuration characteristics associated with
the location of connectors on ATAPI (ATA Packet Interface) CD-ROMs.

The connectors, including audio, are located in the same relative position.

The connectors are located at the rear of the drive, as specified in SFF-8551.
Retaining the same relative location simplifies cabling for the integrator.

No matter whether the unpolarized connectors are located on the top as in
Figure 7-1, or bottom as in Figure 7-2, of the circuit board, they always have
the same orientation. This is not required for the polarized connectors.
EXPRESSION OF SUPPORT BY MANUFACTURERS

The following member companies of the SFF Committee voted in favor of this industry specification.

3M
Adaptec
AMP
Cirrus Logic
ENDL
Honda Connector
IBM
Madison Cable
Maxtor
Methode
Quantum
Robinson Nugent
Sigmax

The following member companies of the SFF Committee voted against this industry specification.

Compaq

The following member companies of the SFF Committee voted to forward this industry specification to an accredited standards body.

Robinson Nugent
8.  5.25" CD-ROM Drive Form Factor

This specification defines the configuration characteristics associated with 5.25" CD-ROM drives.

Table 8-1 defines the dimensions of the drive represented in Figure 8-1. References offset to the left in the dimensions column are variables, and those to the right are tolerances.

Figure 8-1 is a detail of the form factor.

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* = maximum

NOTE: Tolerances are +/-0.25mm (0.010").

EDITORS NOTE: Labeling different heights as A1 and A2 and A3 deviates from SFF Style because the table clearly shows that A1 is a variable (see text in dimensions para above).
- This table style supports showing dimensions and tolerances individually.
- Is a global note about tolerances being +/-0.25mm adequate for this form factor over time? We would be better off to specify individual tolerances now rather than have to come back and change the figure at some time in the future.
In Specifications under review, the figures are not integrated with the text but follow behind its transmittal. Space has been left here so the figure can be pasted in the proper position.

FIGURE 8-1  FORM FACTOR OF 5.25" CD-ROM DRIVE
SFF-8501 Form Factor of 5 1/4" Disk Drive
- PIN 20 KEYED (REMOVED)

CONNECTORS ON TOP OF PCB

- PIN 20 KEYED (REMOVED)

CONNECTORS ON BOTTOM OF PCB

CONNECTOR END

SFF-8508 ATAPI CD-ROM Connectors
Connector End

M3 Screw
3 MIL THREAD DEPTH
3.8 MAX. FASTENER PENETRATION (TYPICAL)

DIMENSION MILLIMETERS INCHES DIMENSION MILLIMETERS INCHES
A1 (H) 84.00 3.272 A11 79.2 3.118
A1 (H) 41.50 1.634 A12
A1 (H) 25.9 1.020 A13 10.00 0.394
A4 (L) 206.00 8.110 A14 21.80 0.858
A5 (W) 146.00 5.748 A6 139.70 5.500
A7 3.15 0.124 A8 79.2 3.118
A9 52.40 2.063 A10 52.40 2.063

TOLERANCES = ±0.25/±.010

Connector End

M3 Screw
3 MIL THREAD DEPTH
3.8 MAX. FASTENER PENETRATION (TYPICAL)

DIMENSION MILLIMETERS INCHES DIMENSION MILLIMETERS INCHES
A1 (H) 84.00 3.272 A11 79.2 3.118
A1 (H) 41.50 1.634 A12
A1 (H) 25.9 1.020 A13 10.00 0.394
A4 (L) 206.00 8.110 A14 21.80 0.858
A5 (W) 146.00 5.748 A6 139.70 5.500
A7 3.15 0.124 A8 79.2 3.118
A9 52.40 2.063 A10 52.40 2.063

TOLERANCES = ±0.25/±.010