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:

Chairman SFF TA TWG
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 in hard copy or electronic form.
SFF Specifications are available at fission.dt.wdc.com/pub/standards/sff/spec

SFF Committee

SFF-8072 Specification for

80-pin Fibre Channel Tape Connector

Rev 1.2  November 12, 1999

Secretariat:  SFF Committee

Abstract: This document specifies a connector and defines the signals and contact
assignments for an FC-TAPE compliant tape drive of approximately the 5.25" form
factor to connect to a backplane or interface card.

This document provides a common specification for systems manufacturers, system
integrators, and suppliers of components in the referenced area. 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.

POINTS OF CONTACT:

Stewart Wyatt                                     I. Dal Allan
Hewlett Packard                                   Chairman SFF Committee
POB 15 #477                                       ENDL
Boise, ID 83714                                   14426 Black Walnut Court
                                                Saratoga CA 95070
Ph: 208-396-3594                                   Ph: 408-867-6630
Fx: 208-396-3319Fx                                 Fx: 408-867-2115
Email: stewart_wyatt@hp.com                       250-1752@mcimail.com
EXPRESSION OF SUPPORT BY MANUFACTURERS

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

Adaptec
AMP
Amphenol
Compaq
DDK Fujikura
ENDL
FCI/Berg
Fujitsu CPA
Hitachi Cable
Quantum
Robinson Nugent
Seagate
TI Japan
Toshiba America
Tyco AMP
Unisys
Yamagata Fujitsu

The following member companies of the SFF Committee voted to abstain on this industry specification.

DDK Electronics
Foxconn Int'l
Honda Connector
IBM
Matsushita
Maxtor
Molex
Montrose/CDT
Pioneer NewMedia
Sun Microsystems
Thomas & Betts
YC Cable
If you are not a member of the SFF Committee, but you are interested in participating, the following principles have been reprinted here for your information.

**PRINCIPLES OF THE SFF COMMITTEE**

The SFF Committee is an ad hoc group formed to address storage industry needs in a prompt manner. When formed in 1990, the original goals were limited to defining de facto mechanical envelopes within which disk drives can be developed to fit compact computer and other small products.

Adopting a common industry size simplifies the integration of small drives (2 1/2" or less) into such systems. Board-board connectors carrying power and signals, and their position relative to the envelope are critical parameters in a product that has no cables to provide packaging leeway for the integrator.

In November 1992, the SFF Committee objectives were broadened to encompass other areas which needed similar attention, such as pinouts for interface applications, and form factor issues on larger disk drives. SFF is a forum for resolving industry issues that are either not addressed by the standards process or need an immediate solution.

Documents created by the SFF Committee are expected to be submitted to bodies such as EIA (Electronic Industries Association) or an ASC (Accredited Standards Committee). They may be accepted for separate standards, or incorporated into other standards activities.

The principles of operation for the SFF Committee are not unlike those of an accredited standards committee. There are 3 levels of participation:

- Attending the meetings is open to all, but taking part in discussions is limited to member companies, or those invited by member companies
- The minutes and copies of material which are discussed during meetings are distributed only to those who sign up to receive documentation.
- The individuals who represent member companies of the SFF Committee receive documentation and vote on issues that arise. Votes are not taken during meetings, only guidance on directions. All voting is by letter ballot, which ensures all members an equal opportunity to be heard.

Material presented at SFF Committee meetings becomes public domain. There are no restrictions on the open mailing of material presented at committee meetings. In order to reduce disagreements and misunderstandings, copies must be provided for all agenda items that are discussed. Copies of the material presented, or revisions if completed in time, are included in the documentation mailings.

The sites for SFF Committee meetings rotate based on which member companies volunteer to host the meetings. Meetings have typically been held during the ASC T10 weeks.

The funds received from the annual membership fees are placed in escrow, and are used to reimburse ENDL for the services to manage the SFF Committee.
If you are not receiving the documentation of SFF Committee activities or are interested in becoming a member, the following signup information is reprinted here for your information.

<table>
<thead>
<tr>
<th>Service</th>
<th>Fee</th>
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<tr>
<td>Annual SFF Committee Membership Fee</td>
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<td>Annual SFF Committee Paper Documentation Fee</td>
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Name: _______________________________
Title: _______________________________
Company: _______________________________
Address: _______________________________
Phone: _______________________________
Fax: _______________________________
Email: _______________________________

Please register me as a Member of the SFF Committee for one year.

Paper documentation $1,800
Electronic documentation $2,160

Check Payable to SFF Committee for $_____ is Enclosed

Please invoice me $_____ on PO #: ___________________

MC/Visa/AmX_____________________________ Expires_____

Please register me as an Observer on the SFF Committee for one year.

Paper documentation $300 U.S. $400 Overseas
Electronic documentation $660 U.S. $760 Overseas

Check Payable to SFF Committee for $_____ (POs Not Accepted)

MC/Visa/AmX_____________________________ Expires_____
Foreword

When 2 1/2" diameter disk drives were introduced, there was no commonality on external dimensions e.g. physical size, mounting locations, connector type, connector location, between vendors.

The first use of these disk drives was in specific applications such as laptop portable computers in which space was at a premium and time to market with the latest machine was an important factor. System integrators worked individually with vendors to develop the packaging. The result was wide diversity, and with space being such a major consideration in packaging, it was not possible to replace one vendor's drive with a competitive product.

The desire to reduce disk drive sizes to even smaller dimensions such as 1.8" and 1.3" made it likely that devices would become even more constrained in dimensions because of a possibility that such small devices could be inserted into a socket, not unlike the method of retaining semiconductor devices.

The problems faced by integrators, device suppliers, and component suppliers led to the formation of an industry ad hoc group to address the marketing and engineering considerations of the emerging new technology in disk drives. After two informal gatherings on the subject in the summer of 1990, the SFF Committee held its first meeting in August.

During the development of the form factor definitions, other activities were suggested because participants in the SFF Committee faced problems other than the physical form factors of disk drives. In November 1992, the members approved an expansion in charter to address any issues of general interest and concern to the storage industry. The SFF Committee became a forum for resolving industry issues that are either not addressed by the standards process or need an immediate solution.

At the same time, the principle was adopted of restricting the scope of an SFF project to a narrow area, so that the majority of documents would be small and the projects could be completed in a rapid timeframe. If proposals are made by a number of contributors, the participating members select the best concepts and uses them to develop specifications which address specific issues in emerging storage markets.

Those companies which have agreed to support a documented specification are identified in the first pages of each SFF Specification. Industry consensus is not an essential requirement to publish an SFF Specification because it is recognized that in an emerging product area, there is room for more than one approach. By making the documentation on competing proposals available, an integrator can examine the alternatives available and select the product that is felt to be most suitable.

Suggestions for improvement of this document will be welcome. They should be sent to the SFF Committee, 14426 Black Walnut Ct, Saratoga, CA 95070.

The development work on this specification was done by the SFF Committee, an industry group. The membership of the committee since its formation in 1990 has included a mix of companies which are leaders across the industry.
TABLE OF CONTENTS

1.    Scope                                             8
  1.1   Description of Clauses                         8

2.    References                                       8
  2.1   Industry Documents                             8
  2.2   SFF Specifications                             8
  2.3   Sources                                        11

3.    General Description                              11

4.    Definitions and Conventions                      12
  4.1   Definitions                                     12
  4.2   Conventions                                    12

5.    Signals                                          13
  5.1   Signal Assignments                             13
  5.2   Power Pins                                     14
  5.3   3.3V Pins                                       15
  5.4   DIFFSNS                                         15
  5.5   Additional 5 Volt Power                        15
  5.6   Additional 12 Volt Power                       15
  5.7   Mated Pin Condition                            15
  5.8   Library Signals                                15

TABLES

TABLE 5-1    FIBRE CHANNEL TAPE SIGNAL ASSIGNMENTS            14
TABLE 5-2    LIBRARY CONNECTION SIGNALS                        16
TABLE 5-3    OUTPUT CHARACTERISTICS OF LIBRARY CONNECTION SIGNALS 16
TABLE 5-4    INPUT CHARACTERISTICS OF LIBRARY CONNECTION SIGNALS 16
TABLE 5-5    RS-422 ABSOLUTE MAXIMUM RATINGS                   16
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TABLE OF CONTENTS

1. Scope
   1.1 Description of Clauses

2. References
   2.1 Industry Documents
   2.2 SFF Specifications
   2.3 Sources

3. General Description

4. Definitions and Conventions
   4.1 Definitions
   4.2 Conventions

5. Signals
   5.1 Signal Assignments
   5.2 Power Pins
   5.3 3.3V Pins
   5.4 DIFFSNS
   5.5 Additional 5 Volt Power
   5.6 Additional 12 Volt Power
   5.7 Mated Pin Condition
   5.8 Library Signals

TABLES

TABLE 5-1 FIBRE CHANNEL TAPE SIGNAL ASSIGNMENTS
TABLE 5-2 LIBRARY CONNECTION SIGNALS
TABLE 5-3 OUTPUT CHARACTERISTICS OF LIBRARY CONNECTION SIGNALS
TABLE 5-4 INPUT CHARACTERISTICS OF LIBRARY CONNECTION SIGNALS
TABLE 5-5 RS-422 ABSOLUTE MAXIMUM RATINGS
SFF Committee --

80-pin Fibre Channel Tape Connector

1. Scope

In an effort to broaden the applications for small form factor disk drives, an ad hoc industry group of companies representing system integrators, peripheral suppliers, and component suppliers decided to address the issues involved.

The purpose of this specification is to define the signals and contact assignments for an FC-TAPE compliant tape drive of approximately the 5.25" form factor to connect to a backplane or interface card.

This specification leverages SFF-8045 and SFF-8067, which use a 40-pin connector designed for 3.5" form factor disk drives, but lacks adequate power supply capability for larger form factor tape drive applications.

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 contains the signal definitions

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 this Specification.

- T10/1302 SPI-3 (SCSI Parallel Interface -3)
- T11/1315 FC-Tape (Tape and Tape Medium Changers)
- SFF-8045 40-pin SCA-2 Connector w/Parallel Selection
- SFF-8067 40-pin SCA-2 Connector w/Bidirectional ESI
- EIA-700A0AE SFF-8451 SCA-2 Unshielded Connections

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.
<table>
<thead>
<tr>
<th>Spec #</th>
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<td>SCSI Wiring Rules for Mixed Cable Plants</td>
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<td>ATA Low Power Modes</td>
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<td>SFF-8019</td>
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<td>Identify Drive Data for ATA Disks up to 8 GB</td>
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<td>INF-8020i</td>
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<td>SFF Committee Principles of Operation</td>
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SFF-8031  E  Improved ATA Timing Extensions to 16.6 MBs
SFF-8034  E  High Speed Local Bus ATA Line Termination Issues
SFF-8035  E  Self-Monitoring, Analysis and Reporting Technology
SFF-8036  E  ATA Signal Integrity Issues
INF-8037  E  Intel Small PCI SIG
INF-8038  E  Intel Bus Master IDE ATA Specification
SFF-8039  E  Phoenix EDD (Enhanced Disk Drive) Specification

SFF-8040  1.2  25-pin Asynchronous SCSI Pinout
SFF-8041  C  SCA-2 Connector Backend Configurations
SFF-8042  C  VHDCI Connector Backend Configurations
SFF-8043  E  40-pin MicroSCSI Pinout
SFF-8045  4.2  40-pin SCA-2 Connector w/Parallel Selection
SFF-8046  E  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-8049  E  80-conductor ATA Cable Assembly

INF-8050i  1.0  Bootable CD-ROM
INF-8051i  E  Small Form Factor 3" Drives
INF-8052i  E  ATA Interface for 3" Removable Devices
SFF-8053  5.4  GBIC (Gigabit Interface Converter)
INF-8055i  E  SMART Application Guide for ATA Interface
SFF-8056  C  50-pin 2mm Connector
SFF-8057  E  Unitized ATA 2-plus Connector
SFF-8058  E  Unitized ATA 3-in-1 Connector
SFF-8059  E  40-pin ATA Connector

SFF-8060  1.1  SFF Committee Patent Policy
SFF-8061  1.1  Emailing drawings over the SFF Reflector
SFF-8065  C  40-pin SCA-2 Connector w/High Voltage
SFF-8066  C  80-pin SCA-2 Connector w/High Voltage
SFF-8067  2.6  40-pin SCA-2 Connector w/Bidirectional ESI
INF-8068i  1.0  Guidelines to Import Drawings into SFF Specs
SFF-8069  E  Fax-Access Instructions

INF-8070i  1.2  ATAPI for Rewritable Removable Media
SFF-8072  1.2  80-pin SCA-2 for Fibre Channel Tape Applications
SFF-8073  -  20-pin SCA-2 for GBIC Applications

SFF-8080  E  ATAPI for CD-Recordable Media

SFF-8090  3.6  ATAPI for DVD (Digital Video Data)

SFF-8200e  1.1  2 1/2" drive form factors (all of 82xx family)
SFF-8201e  1.3  2 1/2" drive form factor dimensions
SFF-8212e  1.2  2 1/2" drive w/SFF-8001 44-pin ATA Connector

SFF-8300e  1.1  3 1/2" drive form factors (all of 83xx family)
SFF-8301e  1.2  3 1/2" drive form factor dimensions
SFF-8302e  1.1  3 1/2" Cabled Connector locations
SFF-8332e  1.2  3 1/2" drive w/80-pin SFF-8015 SCA Connector
SFF-8337e  1.2  3 1/2" drive w/SCA-2 Connector
SFF-8342e  1.3  3 1/2" drive w/Serial Unitized Connector

SFF-8400  C  Very High Density Cable Interconnect
SFF-8410  12.1  High Speed Serial Testing for Copper Links

80-pin Fibre Channel Tape Connector
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 joining the SFF Committee as an Observer or Member.

14426 Black Walnut Ct 408-867-6630x303
Saratoga 408-867-2115Fx
CA 95070 FaxAccess: 408-741-1600

The increasing size of SFF Specifications has made FaxAccess impractical to obtain large documents. Document subscribers and members are automatically updated every two months with the latest specifications. Specifications are available by FTP at fission.dt.wdc.com/pub/standards/sff/spec

Electronic copies of documents are also made available via CD_Access, a service which provides copies of all the specifications plus SFF reflector traffic. CDs are mailed every 2 months as part of the document service, and provide the letter ballot and paper copies of what was distributed at the meeting as well as the meeting minutes.

3. General Description

This SFF specification leverages SFF-8045 and SFF-8067, which use a 40-pin connector designed for 3.5" form factor disk drives, but lacks adequate power supply capability for larger form factor tape drive applications.

The 80-pin connector is the SPI-3 'nonshielded alternate 4 connector' which is specified in EIA-700A0AE and SFF-8451. If a SCSI disk drive is connected to a position which was designed for a Fibre Channel tape drive, the SCSI disk drive will be probably be damaged because of the additional power voltages of SFF-8072. The protection against mixing the two applications is the form factor difference. This standard is to be used exclusively with products that are of the 5 1/4" form factor while the SCSI connector has only been implemented in 3 1/2" products.
The 12V power supply capability was augmented by using the 3.3V contact positions which have not been implemented by either Fibre Channel or SCSI disk drives. Additional 12V power supply capability was provided by assigning power and ground to a set of pins that are used for signals in the SCSI connector. Use of these pins will cause damage if the SCSI and Fibre Channel applications are mixed.

Unless noted otherwise, all the SFF-8067 signals have been included in the same relative position as they occur in the 40-pin connector.

An interface has been included to allow a tape drive to communicate with a library controller using RS-422 and various control signals.

4. Definitions and Conventions

4.1 Definitions

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

4.1.1 Backplane: The components of the enclosure that mechanically support the SCA connector and create or route the required signals and power to the SCA connector from the enclosure. The backplane may be a true multi-device backplane, a paddle card inserted in a host computer, a paddle card attached to an appropriately designed cable, or any component with similar capabilities.

4.1.2 Drive: The peripheral that plugs into the backplane or adapter card using the SCA-2 connector. The peripheral may be any device of any type that meets one of the standard 5 1/4" form factors and establishes its connection to the FC-AL through a standard 80 position SCA-2 connector.

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.

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.

4.2 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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5. Signals

Unless described below, all signals are defined in SFF-8067.

5.1 Signal Assignments

The signal pinout is shown in Table 5-1.
### TABLE 5-1  FIBRE CHANNEL TAPE SIGNAL ASSIGNMENTS

<table>
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<tr>
<th>80-pin SFF-8072 Connector Contact and Signal Name</th>
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<th>80-pin SFF-8072 Connector Contact and Signal Name</th>
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<td><strong>B</strong></td>
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<td><strong>B</strong></td>
<td><strong>B</strong></td>
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<tr>
<td>3  12 VOLTS *1 (S)</td>
<td><strong>B</strong></td>
<td><strong>B</strong></td>
</tr>
<tr>
<td>4  12 VOLTS *1 (S)</td>
<td><strong>B</strong></td>
<td><strong>D</strong></td>
</tr>
<tr>
<td>5  12 VOLTS *2 (S)</td>
<td><strong>B</strong></td>
<td><strong>B</strong></td>
</tr>
<tr>
<td>6  12 VOLTS *2 (S)</td>
<td><strong>B</strong></td>
<td><strong>B</strong></td>
</tr>
<tr>
<td>7  12 VOLTS *5 (S)</td>
<td><strong>B</strong></td>
<td><strong>D</strong></td>
</tr>
<tr>
<td>8  12 VOLTS *5 (S)</td>
<td><strong>B</strong></td>
<td><strong>B</strong></td>
</tr>
<tr>
<td>9  12 VOLTS *5 (S)</td>
<td><strong>B</strong></td>
<td><strong>B</strong></td>
</tr>
<tr>
<td>10 12 VOLTS *5 (S)</td>
<td><strong>B</strong></td>
<td><strong>D</strong></td>
</tr>
<tr>
<td>11 12V GROUND *5 (S)</td>
<td><strong>B</strong></td>
<td><strong>D</strong></td>
</tr>
<tr>
<td>12 12V GROUND *5 (S)</td>
<td><strong>B</strong></td>
<td><strong>D</strong></td>
</tr>
<tr>
<td>13 12V GROUND *5 (S)</td>
<td><strong>B</strong></td>
<td><strong>B</strong></td>
</tr>
<tr>
<td>14 12V GROUND *5 (S)</td>
<td><strong>B</strong></td>
<td><strong>B</strong></td>
</tr>
<tr>
<td>15 12V GROUND *5 (S)</td>
<td><strong>B</strong></td>
<td><strong>B</strong></td>
</tr>
<tr>
<td>16 -ENBL BYP CH1 (S)</td>
<td><strong>D</strong></td>
<td><strong>B</strong></td>
</tr>
<tr>
<td>17 -PARALLEL ESI (S)</td>
<td><strong>D</strong></td>
<td><strong>B</strong></td>
</tr>
<tr>
<td>18 READY LED (S)</td>
<td><strong>D</strong></td>
<td><strong>B</strong></td>
</tr>
<tr>
<td>19 POWER CONTROL (S)</td>
<td><strong>B</strong></td>
<td><strong>B</strong></td>
</tr>
<tr>
<td>20 -ENBL BYP CH2 (S)</td>
<td><strong>D</strong></td>
<td><strong>B</strong></td>
</tr>
<tr>
<td>21 SEL_6 / -DSK_WR (S)</td>
<td><strong>B/D</strong></td>
<td><strong>B</strong></td>
</tr>
<tr>
<td>22 SEL_5 / -DSK_RD (S)</td>
<td><strong>B/D</strong></td>
<td><strong>B</strong></td>
</tr>
<tr>
<td>23 SEL_4 / -INCL_ACK (S)</td>
<td><strong>B</strong></td>
<td><strong>D</strong></td>
</tr>
<tr>
<td>24 SEL_3 / D(3) (S)</td>
<td><strong>B/D</strong></td>
<td><strong>D</strong></td>
</tr>
<tr>
<td>25 FAULT LED (S)</td>
<td><strong>D</strong></td>
<td><strong>B</strong></td>
</tr>
<tr>
<td>26 DEVICE CONT 2 (S)</td>
<td><strong>B</strong></td>
<td><strong>D</strong></td>
</tr>
<tr>
<td>27 DEVICE CONT 1 (S)</td>
<td><strong>B</strong></td>
<td><strong>D</strong></td>
</tr>
<tr>
<td>28 5 VOLTS *4 (S)</td>
<td><strong>B</strong></td>
<td><strong>B</strong></td>
</tr>
<tr>
<td>29 5 VOLTS *4 (S)</td>
<td><strong>B</strong></td>
<td><strong>B/D</strong></td>
</tr>
<tr>
<td>30 5 VOLTS *4 (S)</td>
<td><strong>B</strong></td>
<td><strong>B/D</strong></td>
</tr>
<tr>
<td>31 5 VOLTS *4 (S)</td>
<td><strong>B</strong></td>
<td><strong>B/D</strong></td>
</tr>
<tr>
<td>32 5 VOLTS *4 (S)</td>
<td><strong>B</strong></td>
<td><strong>B</strong></td>
</tr>
<tr>
<td>33 5 VOLTS *4 (S)</td>
<td><strong>B</strong></td>
<td><strong>B</strong></td>
</tr>
<tr>
<td>34 5 VOLTS *1 (S)</td>
<td><strong>B</strong></td>
<td><strong>B</strong></td>
</tr>
<tr>
<td>35 5 VOLTS *1 (S)</td>
<td><strong>B</strong></td>
<td><strong>B</strong></td>
</tr>
<tr>
<td>36 5V GROUND *1 (L)</td>
<td><strong>B</strong></td>
<td><strong>B</strong></td>
</tr>
<tr>
<td>37 reserved (L)</td>
<td><strong>L</strong></td>
<td><strong>L</strong></td>
</tr>
<tr>
<td>38 RMT_START *6 (L)</td>
<td><strong>B</strong></td>
<td><strong>B</strong></td>
</tr>
<tr>
<td>39 5V GROUND *4 (L)</td>
<td><strong>B</strong></td>
<td><strong>B</strong></td>
</tr>
<tr>
<td>40 5V GROUND *4 (L)</td>
<td><strong>B</strong></td>
<td><strong>B</strong></td>
</tr>
</tbody>
</table>

*1 See 5.2  *4 See 5.5  *5 See 5.6  *7 See 5.8
*2 See 5.3  *3 See 5.4  *6 See 5.7

Guide pins: Connected to GROUND (5V) on backplane and device.
L = Long backplane pin length  S = Short backplane pin length

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#### 5.2 Power Pins

The location of these power supply pins match the SCSI SPI unshielded alternative 4 connector assignments.
5.3 3.3V Pins

The SCSI alternative connector positions for 3.3V has been changed to 12V to provide additional power supply capability.

5.4 DIFFNS

Pin 46 is assigned to be a 12V GROUND. In the SCSI LVD/MSE contact assignment, this pin is the DIFFNS. If a SCSI HVD or LVD drive is accidentally plugged into a Fibre Channel slot, this assignment will cause the differential drivers to be disabled.

5.5 Additional 5 Volt Power

These pins are used to provide additional power supply capability to meet the needs of Fibre Channel tape drives which will typically be of a larger form factor and have greater power supply requirements than the disk drives that the SFF-8067 or SPI-3 alternate 4 specifications allowed. These assignments are made using positions that are used for signals in the SCSI standard. The 5 Volts power pins exceeds the maximum input voltage rating defined in SPI-3 for LVD inputs and SE inputs with active negation.

5.6 Additional 12 Volt Power

These pins are used to provide additional 12 Volt power capability to meet the needs of Fibre Channel tape drives. These positions are used for signals in the SCSI standard. Using these pins for 12 Volt power will cause damage if the interface types are mixed.

5.7 Mated Pin Condition

The -DRIVE_PRESENT, START_1/MATED and START_2/MATED signals described in SFF-8067 are being replaced with the MATED_1, MATED_2, RMT_START and DLYD_START signals defined in the SPI-3 alternate 4 connector which are defined in Annex C of SPI-3.

While the RMT_START and DLYD_START signals are in the same position as defined in the SPI-3 alternate 4 contact assignments, the position of the MATED_1 and MATED_2 contacts have been reversed. This prevents a SCSI or Fibre Channel drive from coming ready when plugged into the incorrect backplane. Fibre Channel drives compliant with FC-AL-2 should not enable their transmitters until they have properly mated to prevent damage when inserted into a SCSI backplane.

5.8 Library Signals

The library signals define a connection to a library interface as shown in Table 5-2.

<table>
<thead>
<tr>
<th>TABLE 5-2 LIBRARY CONNECTION SIGNALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signal Name</td>
</tr>
<tr>
<td>-DRIVE_ATN</td>
</tr>
<tr>
<td>-LIB_RST</td>
</tr>
</tbody>
</table>
-LIB_SEN  | If held low by the library, the drive will not appear on Fibre Channel until commanded to. | Library
-LIB_DRV_SEN | Tied low on drive, so library can detect if the drive is present. | Drive
+LIB_TX | RS-422 transmit. | Drive
-LIB_TX
+LIB_RX | RS-422 receive. | Library
-LIB_RX

The characteristics of the signals are defined in Table 5-3, Table 5-4 and Table 5-5.

**TABLE 5-3 OUTPUT CHARACTERISTICS OF LIBRARY CONNECTION SIGNALS**

<table>
<thead>
<tr>
<th>State</th>
<th>Current Drive Available</th>
<th>Output Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIGH</td>
<td>-100 μA &lt; IOH &lt; 100μA</td>
<td>0 &lt; VOH &lt; 5.25V</td>
</tr>
<tr>
<td>LOW</td>
<td>IOL &gt; 2 mA</td>
<td>0 &lt; VOL &lt; 0.5V</td>
</tr>
</tbody>
</table>

**TABLE 5-4 INPUT CHARACTERISTICS OF LIBRARY CONNECTION SIGNALS**

<table>
<thead>
<tr>
<th>State</th>
<th>Current</th>
<th>Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPEN</td>
<td>-20 μA &lt; IIH &lt; 20 μA</td>
<td>2.2V &lt; VIH &lt; 5.25V</td>
</tr>
<tr>
<td>GROUND</td>
<td>IOL &gt; 2 mA</td>
<td>-0.5V &lt; VIL &lt; 0.7V</td>
</tr>
</tbody>
</table>

**TABLE 5-5 RS-422 ABSOLUTE MAXIMUM RATINGS**

<table>
<thead>
<tr>
<th>Receiver Input Voltage</th>
<th>-7.5V to 12.5V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driver Output Voltage</td>
<td>-7.5V to 12.5V</td>
</tr>
</tbody>
</table>