SFF Committee

SFF-8082 Specification for

Labeling of Ports and Cable Assemblies

Rev 5.1 March 18, 2005

Secretariat: SFF Committee

Abstract: This specification defines labeling and identification considerations for use with cable assemblies and device Ports. This subject is important to most enclosure to enclosure and intra-building wiring applications. Specifically the following transport technologies may be affected: Fibre Channel, Ethernet, Infiniband, SAS, and others. Other applications such as power and telecom for these general-purpose considerations are also possible.

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

This specification 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 specification.

The description of a label or labeling procedure in this specification does not assure that the label or the hardware necessary for creating the label is actually available. Labels must comply with this specification to achieve interoperability and interchangeablity between suppliers of cable assembly and Port labels.

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

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EXPRESSION OF SUPPORT BY MANUFACTURERS

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

AMP
Cirrus Logic
ENDL
Fujitsu CPA
Hitachi America
Hitachi Cable
Integral Peripherals
Madison Cable
Matsushita
O R Technology
Pioneer NewMedia
Ricoh
Toshiba America
Western Digital
Yamagata Fujitsu

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

Adaptec
IBM
Maxtor
Montrose/CDT
Quantum

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

Amphenol
Berg
Compaq
DDK Electronics
DEC
Honda Connector
JTS
Methode
Molex
Seagate
Thomas & Betts
Unisys
Winchester Elect

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.

Specifications 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.

Membership includes voting privileges on SFF Specs under development.

CD_Access Electronic documentation contains:
- Minutes for the year-to-date plus all of last year
- Email traffic for the year-to-date plus all of last year
- The current revision of all the SFF Specifications, as well as any previous revisions distributed during the current year.

Meeting documentation contains:
- Minutes for the current meeting cycle.
- Copies of Specifications revised during the current meeting cycle.

Each electronic mailing obsoletes the previous mailing of that year e.g. July replaces May. To build a complete set of archives of all SFF documentation, retain the last SFF CD_Access mailing of each year.

Name: ______________________________ Title: ____________________________

Company: ____

Address: ____

____

Phone: ______________________________ Fax: ______________________________

Email: ____

Please register me with the SFF Committee for one year.

___ Voting Membership w/Electronic documentation $ 2,160

___ Voting Membership w/Meeting documentation $ 1,800

___ Non-voting Observer w/Electronic documentation $ 660 U.S.
$ 760 Overseas

___ Non-voting Observer w/Meeting documentation $ 300 U.S.
$ 400 Overseas

Check Payable to SFF Committee for $_________ is Enclosed

Please invoice me for $_________ on PO #: ___________________

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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 specifications 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 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 specification 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.

SFF Committee --

Labeling of Ports and Cable Assemblies

i. Scope

The subject of labeling of interconnect components is, and will remain for some time in the future, somewhat of a work in progress. This project is a step toward the goal of providing an effective and complete labeling specification for interconnect components. This is the first SFF specification to deal with labeling directly. It is patterned after previous SFF specifications to some extent but there is no other specification which is comparable so the formatting and methodology is significantly new.

The optimum practice for labeling is determined by many factors that may vary widely from application to application. One must know how the component is intended to be used in some detail in order to determine which labeling scheme to pursue. Accurate identification of components and their intended use is part of the foundation for effective interoperability and interchangeability of components.

Labeling specifications for high performance interconnect components have previously been left mostly to individual suppliers without common features between suppliers. The lack of effort by accredited standards bodies or other forums to address the lack of commonality provides the primary motivation for creating this specification.

The labeling specifications herein include enough detail to allow the labels to be useful independent of the supplier that created the label and to be physically created with presently available equipment. Until such time as standards documents include such detail this specification can serve as the basis for the interconnect component labeling methodology.

Easily visible properties of components, such as shape or color, are sometimes used to distinguish one brand from another, to distinguish one system type from another, or just for esthetic reasons. These marketing and nebulous uses, while important, divert the easily visible properties from uses aimed at component identification, component interchangeability and component interoperability that are the main motivations for this project. If the shape or color were to be used for identification of the technical properties of the component the color and shape would then be unavailable for brand distinction, system type distinction, or for esthetics. This conflict almost certainly dooms the acceptance of any scheme that adopts shape or color for functional identification.

Good labeling may make it apparent that a less expensive generic component is adequate for an application. Having these properties readily visible may not appear to be in the interest of maintaining high profit margins for some component suppliers. However, good labeling can be very beneficial for the users of the component.

For non-generic components good labeling may show that the component has applications beyond that where the component was originally designed. This benefits the supplier of the non-generic component because of a larger market size and less dependence on volumes and schedules for other parts of the system. It also benefits the user due to higher volumes and lower volume associated costs.

In order to support the widest possible applicability of all components this document assumes that all the information required to determine the technical suitability of the component for the application is either on the label itself or is available via references on the label. The decision of whether to use such a label or not is left to the supplier/user of the component.

The details contained herein are directed at labeling both optical and electrical interconnect components.

Labeling applications are divided into two parts:

(1) Port and Port component labeling and
(2) Cable assembly labeling.

The information content on the labels maps to specific technologies defined by high performance interconnect or transport standards that apply where ever possible. Reference to the clauses in the applicable standards for specific transports is encouraged.

This specification includes datacom components that are used in bi-directional links where one signal is traveling away from the transmitter at the same time another uncorrelated signal is being received by the neighboring receiver. This can include parallel electrical or optical schemes and trunking schemes, however, schemes for general multi-transport connections through the same connector are not considered. An example of a multi-transport connection is where both Fibre Channel and Ethernet connections are provided through the same multi-conductor or multi-fiber connector. Other applications for electrical components are considered such as power and telecom.

Labeling requirements exist near the separable connectors that define interoperability points in the application. Board mounting points and other semi permanent parts of the application are not considered candidates for labeling via this document . Such non connector related documentation may exist for these points in product design specifications, for example.

Labeling information consists of two basic categories:

(1) Information used to identify the <u>capabilities and safety risks designed into</u> the interconnect or Port containing the connector of interest and

(2) Information needed to identify the <u>field use</u> of the interconnect or Port containing the connector of interest in the field application

Additional categories could be added for example, that:

(a) Identify the actual properties of the specific individual component (i.e. by testing the properties of a component with a specific serial number)

(b) Identify the component’s manufacturing lot.

This project assumes that the component actually delivers performance within the tolerances allowed by its designed properties when installed in service. Failures caused by components that do not meet their designed performance parameters in service are not effectively addressable via any labeling scheme. Failures caused by components installed in applications where they are not appropriate is directly addressable via effective identification. Therefore only the two categories of designed properties and field use properties are included in this labeling document.

Both categories are critical to effective identification but the methodology for creating and specifying the labels that contain the information may be very different. Each category is treated somewhat separately in this specification.

This specification is purposefully designed to specify labels that use the English language and characters. Internationally recognized symbols (icons) and units are allowed. Physical codes such as bar codes are also acceptable.

Symbols are considered equivalent to the use of abbreviations and acronyms in terms of information content and are allowed. A reference list for symbols, abbreviations, and acronyms is desirable and may be provided in future extensions of this specification. The information content in the symbol, abbreviation, acronym, or physical code is strictly limited to the definitions in the reference list. Symbols, abbreviations, acronyms and physical codes are vital to effective labeling because of space constraints on practical labels.

Use of component color or distinctive component shape is problematic for the reasons discussed above concerning brand identification, system type identification, and esthetics and for the following reasons:

- Deference to people who have trouble distinguishing colors
- Long term stability of colors
- Low light applications where colors and shapes may be difficult to distinguish
- Subtle, easily missed, differences of color or shape

Use of tactile properties on the label is not considered. Label size and shape may be used for some limited purposes but is not encouraged for identification purposes.

Distinctions between information required for open and closed systems are defined.

How to handle primary and advanced information is discussed.

The SFF Committee was formed in August, 1990 to broaden the applications for storage devices, and is an ad hoc industry group of companies representing system integrators, peripheral suppliers, and component suppliers.

ii. SFF Specifications

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

F = Forwarded	The specification has been approved by the members for forwarding to a formal standards body.
P = Published	The specification has been balloted by members and is available as a published SFF Specification.
A = Approved	The specification 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 specification is under development at SFF.
E = Expired	The specification has been published as an SFF Specification, and the members voted against re-publishing it when it came up for annual review.
a = archive	Used as a suffix to indicate an SFF Specification which has been Archived. This specification will always be available at the ftp site and new development effort in the subject area shall be done under a new number.
e = electronic	Used as a suffix to indicate an SFF Specification which has Expired but is still available in electronic form from SFF e.g. a specification has been incorporated into a draft or published standard which is only available in hard copy.
i = Information	The specification has no SFF project activity in progress, but it defines features in developing industry standards. The specification 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.

Spec #	Rev	List of Specifications as of March 18, 2005
SFF-8000		SFF Committee Information
INF-8001i	E	44-pin ATA (AT Attachment) Pinouts for SFF Drives
INF-8002i	E	68-pin ATA (AT Attachment) for SFF Drives
SFF-8003	E	SCSI Pinouts for SFF Drives
SFF-8004	E	Small Form Factor 2.5" Drives
SFF-8005	E	Small Form Factor 1.8" Drives
SFF-8006	E	Small Form Factor 1.3" Drives
SFF-8007	E	2mm Connector Alternatives
SFF-8008	E	68-pin Embedded Interface for SFF Drives
SFF-8009	4.1	Unitized Connector for Cabled Drives
SFF-8010	E	Small Form Factor 15mm 1.8" Drives
INF-8011i	E	ATA Timing Extensions for Local Bus
SFF-8012	3.0	4-Pin Power Connector Dimensions
SFF-8013	E	ATA Download Microcode Command
SFF-8014	C	Unitized Connector for Rack Mounted Drives
SFF-8015	E	SCA Connector for Rack Mounted SFF SCSI Drives
SFF-8016	C	Small Form Factor 10mm 2.5" Drives
SFF-8017	E	SCSI Wiring Rules for Mixed Cable Plants
SFF-8018	E	ATA Low Power Modes
SFF-8019	E	Identify Drive Data for ATA Disks up to 8 GB
INF-8020i	E	ATA Packet Interface for CD-ROMs
SFF-8025	0.7	SFF Committee Specification Categories
INF-8028i	E	- Errata to SFF-8020 Rev 2.5
SFF-8029	E	- Errata to SFF-8020 Rev 1.2
SFF-8030	2.0	SFF Committee Charter
SFF-8031		Named Representatives of SFF Committee Members
SFF-8032	1.6	SFF Committee Principles of Operation
INF-8033i	E	Improved ATA Timing Extensions to 16.6 MBs
INF-8034i	E	High Speed Local Bus ATA Line Termination Issues
INF-8035i	E	Self-Monitoring, Analysis & Reporting Technology
INF-8036i	E	ATA Signal Integrity Issues
INF-8037i	E	Intel Small PCI SIG
INF-8038i	E	Intel Bus Master IDE ATA Specification
INF-8039i	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	4.7	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	5.5	GBIC (Gigabit Interface Converter)
SFF-8054	0.2	Automation Drive Interface Connector
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	E	Emailing drawings over the SFF Reflector
SFF-8062		Rolling Calendar of SSWGs and Plenaries
SFF-8064		Unshielded HD Cable/Board Connector System
SFF-8065	C	40-pin SCA-2 Connector w/High Voltage
SFF-8066	C	80-pin SCA-2 Connector w/High Voltage
SFF-8067	3.3	40-pin SCA-2 Connector w/Bidirectional ESI
INF-8068i	E	Guidelines to Import Drawings into SFF Specs
SFF-8069	E	Fax-Access Instructions
INF-8070i	1.3	ATAPI for Rewritable Removable Media
SFF-8072	1.2	80-pin SCA-2 for Fibre Channel Tape Applications
SFF-8073	C	20-pin SCA-2 for GBIC Applications
INF-8074i	1.0	SFP (Small Formfactor Pluggable) Transceiver
SFF-8075	1.0	PCI Card Version of SFP Cage
SFF-8076	-	SFP Additional IDs
INF-8077i	3.1	XFP (10 Gbs Small Form Factor Pluggable Module)
SFF-8078	C	XFP-E
SFF-8079	1.7	SFP Rate and Application Selection
SFF-8080	E	ATAPI for CD-Recordable Media
SFF-8082	5.1	Labeling of Ports and Cable Assemblies
SFF-8084	0.2	0.8mm SFP Card Edge Connector Dimensioning
SFF-8085	0.9	100 Mbs Small Formfactor Transceivers
SFF-8086	0.7	Compact Multilane Connector Mating Interface
SFF-8087	0.7	Compact Multilane Unshielded Connector
SFF-8088	0.7	Compact Multilane Shielded Connector
SFF-8089	1.3	SFP Rate and Application Selection Values
INF-8090i	6.07	ATAPI for Multimedia Devices (Mt Fuji5)
SFF-8101	C	3 Gbs and 4 Gbs Signal Characteristics
SFF-8110	C	5V Parallel 1.8" drive form factor
SFF-8111	1.3	1.8" drive form factor (60x70mm)
SFF-8122		1.8" (60x70mm) w/SCA-2 Connector
SFF-8120	2.6	1.8" drive form factor (78x54mm)
SFF-8123	C	1.8" (60x70mm) w/Serial Attachment Connector
SFF-8124	0.2	Memory Form Factor Disk Drive Connections
SFF-8131		40mmx50mm Form Factor
SFF-8200e	1.1	2 1/2" drive form factors (all of 82xx family)
SFF-8201	2.3	2 1/2" drive form factor dimensions
SFF-8212e	1.2	2 1/2" drive w/SFF-8001 44-pin ATA Connector
SFF-8221	C	Pre-Aligned 2.5" Drive >10mm Form Factor
SFF-8222	2.1	2.5" Drive w/SCA-2 Connector
SFF-8223	2.4	2.5" Drive w/Serial Attachment Connector
SFF-8225	C	2.5" Single Voltage Drive
SFF-8300	1.2	3 1/2" drive form factors (all of 83xx family)
SFF-8301	1.4	3 1/2" drive form factor dimensions
SFF-8302e	1.1	3 1/2" Cabled Connector locations
SFF-8323	1.4	3 1/2" drive w/Serial Attachment Connector
SFF-8332e	E	3 1/2" drive w/80-pin SFF-8015 SCA Connector
SFF-8337e	E	3 1/2" drive w/SCA-2 Connector
SFF-8342e	1.3	3 1/2" drive w/Serial Unitized Connector
INF-8350i	E	3 1/2" Packaged Drives
SFF-8400	C	VHDCI (Very High Density Cable Interconnect)
SFF-8401		Optical Transceiver for Short-Reach Appcns
SFF-8410	16.1	High Speed Serial Testing for Copper Links
INF-8411	1.0	High Speed Serial Testing for Backplanes
SFF-8412	12.2	HSOI (High Speed Optical Interconnect) Testing
SFF-8415	4.1	HPEI (High Performance Electrical Interconnect)
SFF-8416	10.0	HPEI Bulk Cable Measurement/Performance Reqmnts

SFF-8420	11.1	HSSDC-1 Shielded Connections
SFF-8421	2.4	HSSDC-2 Shielded Connections
SFF-8422	C	FCI Shielded Connections
SFF-8423	C	Molex Shielded Connections
SFF-8424	0.5	Dual Row HSSDC-2 Shielded Connections
SFF-8425	1.4	Single Voltage 12V Drives
SFF-8426		HSSDC Double Width
SFF-8429	0.0	Signal Specification Architecture for HSS Links
SFF-8430	4.1	MT-RJ Duplex Optical Connections
SFF-8431		SFP+
SFF-8441	14.1	VHDCI Shielded Configurations
SFF-8451	10.1	SCA-2 Unshielded Connections
SFF-8452	3.1	Glitch Free Mating Connections for Multidrop Aps
SFF-8453		Shielded High Speed Serial connectors
SFF-8460	1.2	HSS Backplane Design Guidelines
SFF-8464		Improved MM HSS Optical Link Performance
SFF-8470	2.9	Multi Lane Copper Connector
SFF-8471	C	ZFP Multi Lane Copper Connector
SFF-8472	9.5	Diagnostic Monitoring Interface for Optical Xcvrs
INF-8475i	2.2	XPAK Small Formfactor Pluggable Receiver
SFF-8480	2.1	HSS (High Speed Serial) DB9 Connections
SFF-8482	1.5	Unshielded Dual Port Serial Attachment Connector
SFF-8483	C	External Serial Attachment Connector
SFF-8484	0.6	MultiLane Unshielded Serial Attachment Connector
SFF-8485	0.5	Serial GPIO (General Purpose Input/Output) Bus
SFF-8500e	1.1	5 1/4" drive form factors (all of 85xx family)
SFF-8501e	1.1	5 1/4" drive form factor dimensions
SFF-8508e	1.1	5 1/4" ATAPI CD-ROM w/audio connectors
SFF-8523	1.3	5 1/4" drive w/Serial Attachment Connector
SFF-8551	3.2	5 1/4" CD Drives form factor
SFF-8552	1.1	5 1/4" 9.5mm/12.7mm Optical Drive Form Factor
SFF-8572	C	5 1/4" Tape form factor
SFF-8610	C	SDX (Storage Device Architecture)

iii. 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 or by download at ftp://ftp.seagate.com/sff

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TABLE OF CONTENTS

1. Introduction

1.1 Overview

This specification contains specifications for labeling the components and interfaces near separable points in an application.

This specification should be treated as a new specification relating to implementing labeling and does not invalidate any previous labeling schemes.

The methods described herein may be more stringent than some common industry practice due to lack of complete specification of labeling methods in the published standards and other documents.

The subject of labeling of interconnect components is, and will remain for some time in the future, somewhat of a work in progress. This project is a step toward the goal of providing an effective and complete labeling specification for interconnect components. This is the first SFF specification to deal with labeling directly. It is patterned after previous SFF specifications to some extent but there is no other specification which is comparable so the formatting and methodology is significantly new.

The optimum practice for labeling is determined by many factors that may vary widely from application to application. One must know how the component is intended to be used in some detail in order to determine which labeling scheme to pursue. Accurate identification of components and their intended use is part of the foundation for effective interoperability and interchangeability of components.

Labeling specifications for high performance interconnect components have previously been left mostly to individual suppliers without common features between suppliers. The lack of effort by accredited standards bodies or other forums to address the lack of commonality provides the primary motivation for creating this specification.

The labeling specifications herein include enough detail to allow the labels to be useful independent of the supplier that created the label and to be physically created with presently available equipment. Until such time as standards documents include such detail this specification can serve as the basis for the interconnect component labeling methodology.

1.2 Marketing information vs technical information

Easily visible properties of components, such as shape or color, are sometimes used to distinguish one brand from another, to distinguish one system type from another, or just for esthetic reasons. These marketing and nebulous uses, while important, divert the easily visible properties from uses aimed at component identification, component interchangeability and component interoperability that are the main motivations for this project. If the shape or color were to be used for identification of the technical properties of the component the color and shape would then be unavailable for brand distinction, system type distinction, or for esthetics. This conflict almost certainly dooms the acceptance of any scheme that adopts shape or color for functional identification.

1.3 Some business impacts of good technical labeling

Good labeling may make it apparent that a less expensive generic component is adequate for the application. Having this property may not appear to be in the interest of maintaining high profit margins for some component suppliers. However, good labeling can be very beneficial for the users of the component.

For non-generic components good labeling may show that the component has applications beyond that where the component was originally designed. This benefits the supplier of the non-generic component because of a larger market size and less dependence on volumes and schedules for other parts of the system. It also benefits the user due to higher volumes and lower volume associated costs.

In order to support the widest possible applicability of all components this project assumes that all the information required to determine the technical suitability of the component for the application is either on the label itself or is available via references on the label. The decision of whether to use such a label or not is left to the supplier/user of the component.

1.4 Direct and indirect labeling

This project assumes that the information required to determine the technical suitability of the component for the application is either on the label itself or is available indirectly via references on the label. Examples of specifications for the format and content of the label are also included in this specification. The decision of whether to use such a label or not is left to the supplier/user of the component.

1.5 General requirements for labels

General requirements for labels of all types is discussed in 3.3.

The information content on the labels maps to specific technologies defined by the high performance interconnect or transport standards (e.g. Fibre Channel) that apply where possible. Reference to the clauses in the applicable standards for specific transports is encouraged.

1.6 Label locations

Labeling requirements exist near the separable connectors that define interoperability points in the application. See 3.1. Board mounting points and other semi permanent parts of the application are not considered candidates for labeling via this document . Such non connector related documentation may exist for these points in product design specifications.

1.7 Labeling applications

1.7.1 Component physical structure

There are two kinds of component considered for labeling in this document:

(1) Port and Port components
(2) Cable assemblies

These components include datacom components that are used in bi-directional links where one signal is traveling away from the transmitter at the same time another uncorrelated signal is being received by the neighboring receiver. This can include parallel electrical or optical schemes and trunking schemes, however, schemes for general multi-transport connections through the same connector are not considered. An example of a multi-transport connection is where both Fibre Channel and Ethernet connections are provided through the same multi-conductor or multi-fiber connector.

1.7.2 Technical application classes

The details contained herein are directed at labeling both optical and electrical interconnect components. For the electrical components multiple technical application classes are defined such as datacom, power, and telecom. For optical components only datacom and telecom technical application classes are used because optical interconnect are not used for the distribution of power.

A key difference between the datacom and telecom technical application classes is the required level of signal integrity; telecom is generally more forgiving than datacom.

1.7.3 Business application classes

The business application class distinguishes how the component is used in a business sense (i.e. whether the component is used in an open or closed application - see 3.6).

1.7.4 Primary and advanced information

Information is also classified by considering whether the information is primary (required for the basic function) or advanced (additional information that defines the application) (see 3.7).

1.8 Information category

Labeling information consists of two basic categories (see 3.5):

(1) Information used to identify the capabilities and safety risks designed into the interconnect or Port containing the connector of interest and

(2) Information needed to identify the field use of the interconnect or Port containing the connector of interest in the field application

Additional categories could be added for example, that (a) identify the actual properties of the specific individual component (i.e. by testing the properties of a component with a specific serial number) or (b) identify the component's manufacturing lot.

This project assumes that the component actually delivers performance within the tolerances allowed by its designed properties when installed in service. Failures caused by components that do not meet their designed performance parameters in service are not effectively addressable via any labeling scheme. Failures caused by components installed in applications where they are not appropriate is directly addressable via effective identification. Therefore only the two categories of designed properties and field use properties are included in this labeling project.

Both categories are critical to effective identification but the methodology for creating and specifying the labels that contain the information may be very different. Each category is treated somewhat separately in this specification.

1.9 Hierarchy of labeling information

Table 1 and Table 2 show the hierarchical relationship between the divisions of labeling information:

(1) Business application class (open/closed)
(2) Technical application class (datacom, telecom, power)
(3) Information class (design/use)
(4) Type of information (primary/advanced).

Table 1- Relationship of labeling information for open applications

Datacom applications		Telecom applications		Power applications	
Design properties	Field use properties	Design properties	Field use properties	Design properties	Field use properties
Primary (1) or	Primary (2) or	Primary (3) or	Primary (4) or	Primary (5) or	Primary (6)or

Advanced (7)	Advanced (8)	Advanced (9)	Advanced (10)	Advanced (11)	Advanced (12)

Table 2- Relationship of labeling information for closed applications

Datacom applications		Telecom applications		Power applications	
Design properties	Field use properties	Design properties	Field use properties	Design properties	Field use properties
Primary (13) or Advanced (19)	Primary (14) or Advanced (20)	Primary (15) or Advanced (21)	Primary (16) or Advanced (22)	Primary (17) or Advanced (23)	Primary (18) or Advanced (24)

For example, one piece of labeling information may have the basic classification: open, telecom, field use, advanced.

There are 24 different basic classifications for labeling information in this model as shown in Table 1 and Table 2 by the numbers in parentheses. One may uniquely identify the label application class by the numbers alone. The basic classification for the labeling information must be known in order to properly use the labeling information.

2. Definitions and abbreviations

Port: the connector associated with an active component - typically a device.

Cable (bulk cable): electrically conducting wires or optical fibers with no connectors attached and no pre-forming or local preparation in anticipation of attaching connectors

Cable subassembly: bulk cable that has been pre-formed in anticipation of connectors being attached (no separate labeling requirements identified in this document)

Cable assembly: bulk cable with connectors attached on each end

PMD: Physical media dependent

Transceiver Port: A transceiver port for purposes of this specification is a connector connected to an active transceiver in the same package
. If the transceiver port is part of a device that supports the protocol for a specific variant of a specific transport protocol then the term device port is used.

3. General

3.1 Definition of “label”

A label is the physical entity that contains information pertaining to the part of the component in the immediate vicinity of where the label exists or to a specified remote part of the component (such as the opposite end of a cable assembly). A label may be an integral part of the component, for example cast in the zinc of a connector housing that is on one end of a cable assembly, or may be a separate part, for example a tag that is wrapped around the fiber of an optical cable assembly.

This document assumes that the physical placement of the label is easily and unambiguously associated with the component or part of the component where the information on the label applies. If there is any ambiguity concerning the applicability of the information on the label, supplemental identifiers such as arrows or verbal description shall be contained within the label to remove the ambiguity.

Note that identifying information that is read or written from/to active components via an electronic interface satisfies this definition of a label. In this electronic interface case the means for extracting/modifying the information is an intrinsic part of the label even though this means may exist physically separated from the information.

3.2 Basic labeling unit

The basic labeling unit is the collection of numbers, words, symbols, physical codes (e.g. bar codes), and the physical implementation properties (e.g. tag, electronic etc.) that contain the information to be conveyed by the label.

3.3 General requirements for labels

The general requirements for labels are:

- That non-coded physical labels be visually readable in normal room light without the need for magnifiers for a person of average visual acuity
- That the information on the label be accessible while the system is in an operational state such that the label information is useful – for example, on removable PMD devices (such as an SFP) physical labels on the internal connector or the PMD body may not be visible after the PMD is installed - however, the label information is accessible in the appropriate system operational state since the label information is used to determine whether to use that PMD in a particular bulkhead slot before inserting the PMD device
- That the label be durable under the environmental and installation conditions expected for the application
- That the presence of the label not affect the performance of the label’s related component or Port or that the label be installed prior to the final test for the component if its presence may affect the component’s performance
- That the label not interfere with other parts of the system
- That the field use information (see clause 1) be easily modified in the field
- That the label not introduce any safety or environmental issues
- That any references to material not explicitly contained in the label be readily available to the personnel using the component – such references shall also be stable for at least the expected life of the component - for open applications the referenced material shall be publicly available

Meeting these requirements is non-trivial and requires significant planning and knowledge of the applications and components. Some incurred costs are expected.

3.4 Information forms

3.4.1 Overview

Information used for component or Port identification comes mostly in five forms:

- Size and shape
- Color
- Icons, abbreviations, symbols, acronyms
- Written material (character based)
- Physical coding

Size (and shape), color, and icons all have the property that they do not require a common written or spoken language to communicate their information. The depth of information conveyed is seriously limited in all three of these forms. Therefore, effective labeling of cable assemblies and Ports components requires written information and/or physical coding (possibly supplemented with icons, abbreviations, symbols and acronyms) except when the application is closed (see 3.6).

Figure 1 shows a graphical representation of the relative amount of information contained in the five different forms.

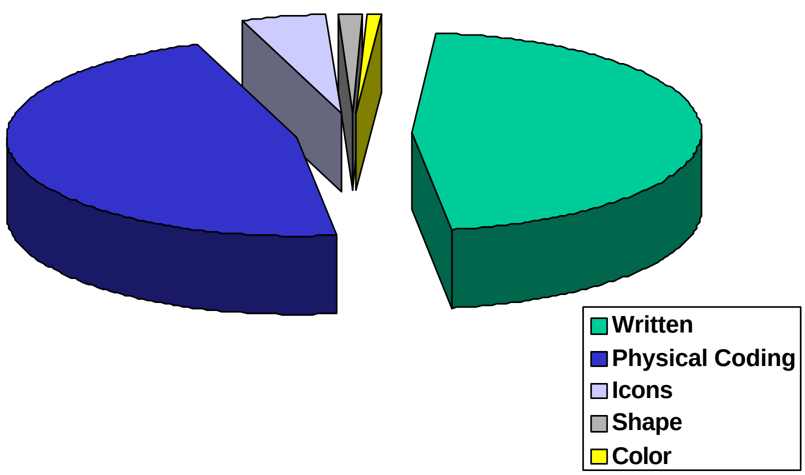

Figure 1 - Relative information content for different information forms

This specification is purposefully designed to specify labels that use the English language and characters. Internationally recognized symbols (icons) and units are allowed.

The following sub-clauses provide more detailed discussions about each form.

3.4.2 Size and shape

The most effective information form is sometimes the size and shape of the component itself including any keying that may be used. Size and shape is usually adequate to identify the basic type of connector and retention scheme. This information is useful but limited because, for example, the tolerances may be different for different fiber types in the same basic connector. Single mode fiber requires tighter tolerances than multimode fiber even though the connectors look the same physically. In another example the size and shape of the optical fiber itself may be very ineffective for determining the type of fiber within. A single 3 mm diameter jacketed optical fiber cable may contain virtually any kind of fiber and may contain multiple fibers.

Distinctive component shape is problematic for identification of component performance properties. This is because of the reasons discussed in clause 1 above concerning conflict with brand identification, system type identification, and esthetics uses and for the following reasons:

- Low light applications where shapes may difficult to distinguish
- Subtle, easily missed, differences of shape

Use of tactile properties on the label is not considered in this project. Label size and label shape could be used for some limited purposes but is not encouraged for identification purposes.

3.4.3 Color

There is some consistency with the use of color for identification of designed properties of components. For example, orange, brown, or black on the fiber cable jacket may indicate some form of multimode fiber. Yellow may indicate some form of single mode fiber. Blue on a transmitter may indicate a long wave single mode type.

Color is very limited in the depth of information it can provide and color is not always used in the same way.

In a specific example of using colors in different ways, boot colors in duplex optical cable assemblies were proposed to identify the use of the fiber inside the boot. One camp of people thought that common colors on connector boots on opposite ends of the optical cable assembly would indicate a common fiber – one end being that connected to the transmitter on one end and the other being connected to the receiver on the other end. However, another camp wanted the common color to mean a common function (i.e. all transmitter connections have the same color). In the second case the boot colors on opposite ends of the cable assembly for the same fiber would be different. Both cases would have two different colors on each end of the cable assembly but the meaning is completely different in the two cases.

Therefore, color features are useful, maybe, in some cases.

Use of component color is also problematic for the reasons discussed in clause 1 concerning conflict with brand identification, system type identification, and esthetics uses and for the following reasons:

- Deference to people who have trouble distinguishing colors
- Long term stability of colors
- Low light applications where colors may be difficult to distinguish
- Subtle, easily missed, differences of color

3.4.4 Icons and symbols

Icon or symbols are a convenient way to convey some information. For example, Icons might indicate which standard was used as the basis for the performance requirements on the port or cable assembly. Even if one could figure out which standard goes with which icon, the icon may not say which variant of the standard applies. Abbreviations, symbols, and acronyms are all essentially the same as icons in their information content.

3.4.5 Written material

English language written material is the preferred method for providing information on the label if visual reading is expected and space permits. Written material consumes the most space but has the least chance of being misinterpreted. The conflict between space available and the amount of written material desired constitutes a core trade off set for practical labels.

3.4.6 Electronic labels

Electronic labels (not the same as physical coding) are those that are read and written through an electrical interface on the component. Electronic labels are commonly found on active Port components but passive components (e.g. passive transponders) may also be used to produce electronic labels. The format of the label may be identical to that used on a physical label but the amount of information may be significantly greater for the electronic label.

3.4.7 Physical coding

Physical coded material on the label itself (such as a bar code or a magnetic strip) is the preferred method for providing information on the label if a machine reading of the label is expected. This scheme also has the following advantages:

- Translation of the meaning of the label into various languages is facilitated in principle by the reader
- Ambient light is less of a factor since the reader uses its own reading scheme with a self contained light source (bar codes) or a magnetic strip sensor.
- Danger of misreading is reduced
- Translation of the label content into and from the standard label formats is easy

Disadvantages include (1) requiring the reader/writer to be positioned in highly constrained places and (2) that a separate piece of equipment is required.

3.5 Information classes for labels

Information on labels comes in two basic classes:

- Component design properties
- Field use properties

Component design properties information is that determined by the intended physical properties of the component. Field use property information is determined by how and where the component is used and by the kind of traffic it supports.

Component design property information may be physically attached to or imbedded within the component and is the same regardless of the use of the component in service.

Field use property information must be added after the application for the component is known. For open applications (see 3.6) field use property information must be applied in the field because it is only then that the end use application is known.

3.6 Open and closed applications

Open applications are those where the details of the end use are not known when the component is designed and manufactured. Generic components are intended for open applications.

Closed applications are those where all the parts needed to build the system are included as part of a kit that is sold with the system or where all the relevant details of the application are known when the component is designed. Some rudimentary identification may be needed for components of closed systems but risk of ineffective identification is small since the parts were designed or specified for use with the other hardware in the closed system.

Closed applications require detailed knowledge of the end use application prior to the component design and manufacture. If desired, the field use properties information may be applied in the design or manufacturing process. Field modifiable labels may not be required. Exceptions to this statement include conditions where multiple ports of the same type exist and field identification for the interconnect associated with a specific port is required. Some reference on the label to the closed application should be included.

Figure 2 shows a graphical summary of the discussion in this sub-clause.

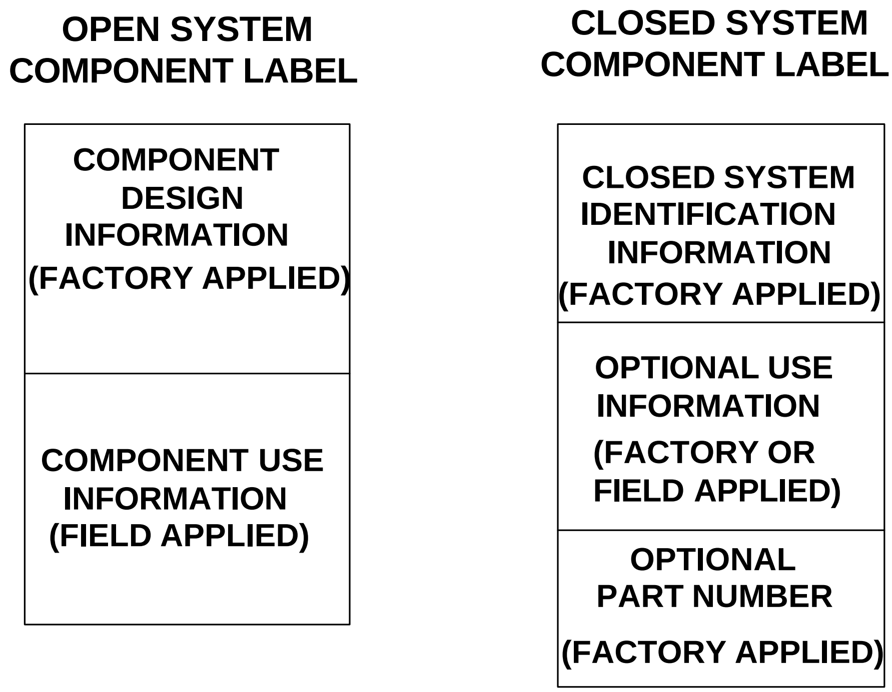

Figure 2 - Basic label information requirements

The remainder of this specification is aimed at the open system component labeling applications.

3.7 Types of information

In order to deal with the severe limits of space required for complete labels the following division of information types is created:

- Primary
- Advanced

Primary information is that which is likely to prevent any operation unless matched to components and application that are compatible. Advanced information is that which is needed to have features beyond the basic operation.

Primary and advanced information do not necessarily map to design property information and field use information.

Labels shall contain all primary information and may optionally contain advanced information.

3.8 Part number reference systems

A part number reference system can conceptually provide an efficient way to map some component design property information to the specific component without burdening the hardware with large labels. The part number method is problematic for open systems, however, when multiple suppliers for the same functional component are available.

At a minimum a cross reference list is required if part numbers are used for generic components. It is also required that the specifications for the part number be available publicly.

A clear indication that a component is not an open component is when a part number is used as the main identifier but the specifications for the part number are not publicly available. Publicly available specifications that do not contain adequate detail is another indication that the component is not open.

This SFF specification assumes that part number identifiers, when used as the primary means for identifying design properties, are useful only for closed applications.

The design properties identifiers should use references to stable public standards or other documents with specific reference to the variants in the documents that apply. Alternatively the label should contain the design properties explicitly.

3.9 Values of parameters on labels

3.9.1 General

Values of parameters on labels are case sensitive alphanumeric for a total of approximately 62 single digit values. The number zero should be used with the slash, ∅, to distinguish it from the letter ‘O’. Dual digit schemes allow up to 3844 unique values.

Character enhancements such as underlining, bolding, and italicizing may be used to enhance readability but do not carry any information other than that conveyed by the character.

3.9.2 Choice of character on the label

Whenever possible the value on the label should correspond to the literal value for the parameter.

For example, assuming that the literal value is a numerical quantity the literal value would be numerical and the order of use would be numerical first, capital letter next, lower case letter as a last resort. It is a user choice whether to use the single digit alpha or multiple digit numerical scheme for numerical quantities that cannot be represented by a single digit number.

If the literal value is an alpha quantity the order of use would be capital letter first, lower case letter next, and numerical last.

For conditions when the literal value cannot be represented by the preferred method an external reference is required to determine the desired value.

3.9.3 Meaning of the value shown on the label

Values of parameters shall be the nominal designed values for the component (e.g., 100 Ohms) unless otherwise noted. Parameters that indicate the actual property of the specific part (by serial number) shall be clearly marked as distinct from the designed value. Normally this should be obvious because the actual property of the specific part is not a round number (e.g.,.103.2 Ohms for the actual property versus 100 Ohms for the designed value).

3.10 Overview of label attachment schemes

Labels may be attached by any suitable means. Some of these are listed below:

- Sticker type with adhesive on one side and the written material on the other
- Integral type (usually for design information only since field modification may be difficult) where the label information is formed directly into the component during manufacture or later. Die cast connector housings may contain label information in the cast for example. Etching or printing after fabrication and writing with an engraving pen are other examples of integral type labels.
- Wrapped type where the label is literally wrapped around the component. An example is a label on a bulk cable that is wrapped around the cable and covered with transparent tape.
- Flag type where a durable flexible material is used for the label and is firmly attached along one edge leaving the body of the label free
- Ring type where a donut shaped label surrounds the component but is not firmly attached to the component in one place. A variation on this scheme is a rigid ring that surrounds the component with a tag attached to the ring.

3.11 Special considerations for label attachment

Label attachment is an intrinsic part of the label design. The label attachment is subject to all the requirements of labels in general as described in 3.3. An example of an inappropriate label attachment is placing the label on a removable PMD component in a place that interferes with the EMI containment portions of the connectors. Another example of poor label attachment is using a flag type label attached to the bulk cable near the connector end where high density panel connectivity is needed. The flag type label interferes with access to the mating interface of the connectors on the panel.

4. Port and port component labeling

4.1 Overview

The application class shall be available for all labels. The application class defines the business class (open or closed), the technical class (datacom, telecom, or power), the information class (design or field use) and the information type (primary or advanced) as described in 1.9. One may use the numbering system shown in Table 1 and Table 2 for a shorthand method of identifying the label application class.

Clause 4 describes the architecture for labels of ports and port components.

For electrical applications ports may exist whose function is sourcing or sinking of power. This document treats power ports and data/communications ports as architecturally equivalent for labeling purposes. The text used in this clause describes the data/communications applications.

4.2 General port requirements

4.2.1 Device and transceiver ports

A transceiver port for purposes of this specification is a connector connected to an active transceiver in the same package. If the transceiver port is part of a device that supports the protocol for a specific variant of a specific transport protocol then the term device port is used.

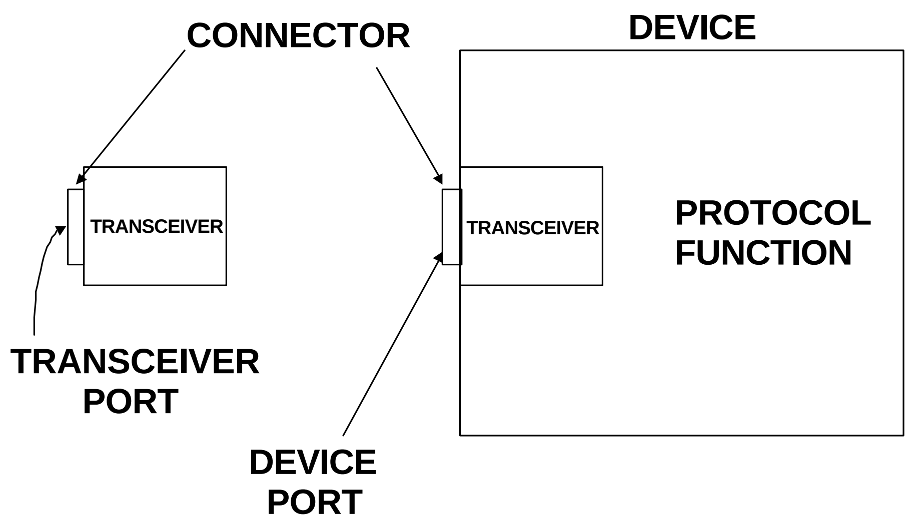

Figure 3 - Two types of port

The main distinction between a transceiver port and a device port is that the device port is required to support the requirements for the transport protocol being used by the device. These requirements usually include specific analog requirements on the transceivers and also include many requirements on the data structures and content. Transceiver ports (not part of a device) are not protocol aware but may have the analog properties required by specific transport protocol standards.

In this specification only design property information for ports is considered. Field use information for ports is usually variable only for Port numbers. For Ports that are protocol agile and/or speed agile the field use properties may be more variable.

4.2.2 Physical port implementation types

Two types of physical port implementation are defined:

- Hardwired transceivers
- User removable transceivers

These types should be evident by physical examination.

4.2.3 Port label parameter values and character size

For all cases the label should be at least 6 point font using all capital letters if possible (where letters are used). Otherwise use the largest font that will fit in the space available.

In all cases the port should have a number associated with the physical port. Note that this may be different from the number associated with the logical port (i.e. Port address).

4.3 Transceiver ports

The following parameters are primary information for transceiver ports:

1. Data rates or frequency: (2 digits)
2. Nominal wavelength (optical) or nominal signaling/power type (electrical): (2 digits)
3. Physical variant of transport standard: for FC for example LC-L (4 digits)
4. Number of the physical port (N digits)

Note that the reference to a specific variant of a specific transport defines many physical and signal requirements but may carry no protocol requirements.

4.4 Device ports

The device port label carries all the information for the transceiver port identified in 4.3 and adds the following primary parameter that identifies the specific transport type supported by the device.

1. Transport type (including the physical architecture used in the ports): (4 digits) where the first two digits describe the transport e.g. FC for Fibre Channel and the second two digits are descriptors for other parameters such as number of parallel fibers, number of data channels, organization of paths (serial, parallel, multiplex)

4.5 Hardwired ports

For the hardwired scheme the labeling for the port is a 12 digit alphanumeric field that shall be visible on the body of the external connector (when demated) or other surface visible to the user that is permanently attached to the hardware containing the transport protocol chip. These 12 digits support all but the physical port number. Additional digits are required to support the physical number of the port as needed to support the physical numbering scheme for the system.

4.6 User removable transceivers

4.6.1 Labels on the port that accepts the removable transceiver

For enclosures that are compatible with user removable transceivers the transport type and data rate (a 6 digit alpha numeric field) shall be visible on the cavity door or other enclosure surface visible to the user near the cavity. The enclosure is that which contains the transport protocol chip or the supporting electronics for the transceiver (e.g a hub).

Additional digits are required to support the physical number of the port as needed to support the physical numbering scheme for the system.

4.6.2 Labels on the removable transceivers proper

For the removable transceiver proper the following shall be indicated:

- Data rate(s) that the transceiver supports (2 digits)
- Nominal wavelength (optical) or nominal signaling type (electrical) (2 digits)
- Physical variant of transport standard: for FC for example LC-L (4 digits)

This information shall be indicated using the 8 digit field and shall be visible to the user when the external cable is demated and the removable transceiver is installed.

4.7 Advanced labeling parameters for ports

Additional parameters and label spaces may be of use for “advanced” labeling of ports (all M digits):

- Autonegotiation implemented?
- Auto test mode implemented?
- Spectral width (optical only)
- Actual center wavelength (optical only)
- Launch power (optical) or launch amplitude (electrical)
- Receiver sensitivity
- A.C. coupling method if any
- Compensation method used if any
- Termination values for receiver ports
- Source termination values for transmitter ports

These advanced parameters may be included directly on the labels or indirectly via references. but should be available from product specifications.

4.8 Summary for ports

A summary of labeling requirements for ports is given in Table 3:

Table 3 - Summary of labeling requirements for Ports

Port description	Number of physical port	Data rate	Wavelength/ signaling type	Transport + variant	Transport type	Advanced
	N digits	2 digits	2 digits	4 digits	4 digits	M digits
Hardwired transceiver port	Anywhere near or on the port connector	Anywhere near or on the port connector	Anywhere near or on the port connector	Anywhere near or on the port connector	Anywhere near or on the port connector	Anywhere near or on the port connector
Hardwired device port	Anywhere near or on the port connector	Anywhere near or on the port connector	Anywhere near or on the port connector	Anywhere near or on the port connector	Anywhere near or on the port connector	Anywhere near or on the port connector
User removable transceiver component	N/A	On the transceiver visible when the connector	On the transceiver visible when the	On the transceiver visible when the	N/A	Anywhere on the transceiver

(either transceiver or device port)		is demated	connector is demated	connector is demated		
Enclosure that accepts a user removable transceiver (either transceiver or device port)	Anywhere near the transceiver cavity	Anywhere near the transceiver cavity	N/A	N/A	Anywhere near the transceiver cavity	Anywhere near the transceiver cavity

5. Cable assembly labeling

5.1 General

Cable assemblies are components that contain separable connectors on each end of an optical fiber or electrical bulk cable. Since cable assemblies may be quite long it is common that one cannot see both ends of the cable assembly at the same time. This condition produces a requirement for the label that the location and port properties of the far end be noted on the label on the near end.

Cable assemblies have the same general considerations as ports as described in clause 4.

Clause 5 describes the architecture for labels of cable assembly components.

5.2 Cable assembly labeling in an open environment

Design information shall be provided on both ends of the cable assembly by public standards reference or by specifically including the information in 5.5.1. The subset relating to the bulk cable properties (items 3, 4, 5, 6, and 11 in 5.5.1) may be printed on the cable jacket, by public standards reference.

5.3 Cable assembly labeling in a closed environment

Design information shall be provided on both ends of the cable assembly through a part number reference, by public standards reference, or by specifically including the information in 5.5.1. The subset relating to the bulk cable properties (items 3, 4, 5, 6, and 11 in 5.5.1) may be printed on the cable jacket, by public standards reference, or by reference to the part number for the bulk cable.

5.4 Use information and application class

Use information for cable assemblies shall be affixed to the body of the bulk cable near each connector using a tag. This tag may be field attachable and shall have adequate space to contain the information specified in clause 5. Means for adding the field use information shall be provided.

The application class shall be available for all labels. The application class defines the business class (open or closed), the technical class (datacom, telecom, or power), the information class (design or field use) and the information type (primary or advanced) as described in 1.9. One may use the numbering system shown in Table 1 and Table 2 for a shorthand method of identifying the label application class.

5.5 Specific requirements for labeling cable assemblies

5.5.1 Information determined by the component design

5.5.1.1 Primary information

The following primary properties are fixed by the cable assembly design:

1. Basic application (2xFC, SPI-4, SAS-1.0, 3 phase 208V power, etc) (2 digits or standardized icons if the icon alone is adequate to describe the application - an example of inadequate icon information is the USB symbol that does not distinguish between USB 1.0 and USB 2.0)
2. Cable assembly length (2 digits)
3. Minimum bend radius (2 digits)
4. UL class (4 digits)
5. Bulk cable type (SM, M5, M6, etc.) (2 digits)
6. Pinout reference if not included in the basic application specification

5.5.1.2 Advanced information

The following advanced properties are fixed by the cable assembly design:

1. Bulk cable grade (2 digits)
2. Connector grade (SM, MM etc.)(2 digits)
3. Zero dispersion wavelength for the fiber (optical only) (2 digits)
4. Maximum return loss (2 digits)
5. Fiber end face type or electrical contact type (angled, straight) (2 digits)
6. Ecological impact (2 digits)
7. Number of active fibers or wires in the connector (2 digits)
8. Maximum insertion loss (2 digits)
9. Insertion force (2 digits)
10. Removal force (2 digits)
11. Axial withstanding force (2 digits)
12. CMPT performance (2 digits)
13. Torque requirements on retention mechanism (2 digits)

5.5.2 Information determined by how the component is being used

The following properties are defined by how the cable assembly is used:

1. Physical port number for the near end cable assembly connection (N digits)
2. Physical port number for the far end cable assembly connection (N digits)
3. Physical location of far end (W digits)
4. Physical location of near end (W digits)
5. Transport (FC, GBE, IB etc) (4 digits)
6. Total link length including all concatenated cable assemblies in the link (2 digits)
7. Data rate being used (2 digits)
8. Wavelength (optical) or signaling type (electrical) being used (2 digits)
9. Spectral width being used (2 digits)

6. Physical labeling requirements

6.1 General requirements

In future revisions of this specification requirements for the details of the labeling may be developed. In this revision, some initial thoughts are presented.

6.2 Implementation options

6.2.1 Cable assemblies

There are at least three basic options for applying written design property information on cable assemblies:

- Printed on the cable jacket
- Printed on the connector or backshell
- Printed on a tag

For field use property information on cable assemblies the only option presently identified is the tag.

6.2.2 Ports

For ports the following options exist for written design property information:

- Printed on the external connector and visible when the connector is unmated
- Printed on the bulkhead of the enclosure containing the port
- Printed on the body of the removable transceiver
- Contained electronically within the Port

Field use property information for ports is limited to identification of the port number.

6.3 Physical implementation of labels

Any printing on the component or the enclosure may be done in a durable way during the component manufacturing or may be applied by some sort of separate label. The preferred method is factory applied because the size advantages of special tooling may be applied and the specific space for the label becomes part of the design constraint for the component.

Applying labels (other than tags on cable assemblies) after the component has been designed is problematic for two reasons:

- The tolerances required for attaching the label must consider the ability of humans to place the label accurately
- Suitable space for the label may not be available

In the case where a tag or separate label is possible, the information in 6.4 describes some technology for producing physical labels.

6.4 Examples of technology for production of separate labels or tags

This section identifies examples of equipment that may be considered for use with labeling. This document does not endorse this equipment and encourages users to do their own research. This material is provided for convenience only.

Brother makes a labeling machine that can attach to a PC/Laptop. It comes with software but creation of a custom piece of software that implements the labeling strategy described in this specification may be better. The software could be delivered on a CD with the rest of the RackBuilder software or on the web or with other products.

Several companies already offer cable labeling devices and software. See for example the Panduit links below.

http://www.panduiteeg.com/product_category/PS_printers.asp

http://www.panduiteeg.com/product_category/PS_labels.asp

http://www.panduiteeg.com/product_category/PS_software - labels.asp

The following information was derived from these links:

Printer: **PT-2500pc**

COMPUTER LABEL PRINTER
[Uses up to 1", Laminated TZ tape]

An ideal mix of affordability, versatility, and great features, the P-Touch 2500pc is an attractively styled computer label printer that will produce high quality laminated labels right from your computer. With an easy to use, 32-bit label design software program and wide selection of colorful "TZ" tape combinations, you can quickly create professional looking signs, shelf and property tags, storage and presentation labels, and more! For added convenience, the P-Touch 2500pc has a built-in automatic tape cutter and one-step, drop-in tape cassette design. Complete with printer, cable, software and tape, the P-Touch 2500pc delivers the price, features and quality you need for your home, office and business applications.

ADDITIONAL FEATURES

- PC and Macintosh® Compatible
- Uses laminated "TZ" tapes available from 1/4"(6mm) to 1"(24mm) wide
- Built-in automatic tape cutter
- 13 bonus TrueType® fonts included
- Import file formats:
    - Windows®- BMP, ICO, DIB, JPG, GIF, TIF and WMF
    - Macintosh®- BMP, PICT, JPEG and TIFF
- Over 700 clip art pictures and symbols
- 13 resident bar code symbologies
- Auto formats for fast, easy label designs
- Calendar, Date and Time insert function
- Prints up to 5,000 multiple copies
- Automatic number and alphabet sequencing
- Custom stamp-making option
- Special effects split, mirror and vertical printing
- Unit Dimensions: 2.5"(W) x 3"(D) x 6"(H)
- Unit Weight: 2lbs (without tape cassette, I/F cable andAC adaptor)

- Includes:
    - Bonus CD-ROM
        - P-Touch Editor Software (Windows® and Macintosh®)
        - Windows® 95/98/NT and Macintosh® Printer driver
        - True Type® fonts
        - User's Guide
    - Serial Printer Cable (RS-232C/ RS-422)
    - Power Adaper
    - 1/2" wide "TZ" tape (Black on White)

Home/Office

* File/Storage

* Asset Tags

* Presentation/Reports

Business

* Retail Shelf Tags and Signs

* Packaging Information

* Customized Services

Inventory

* Auto ID/Bar Codes

* Packaging Updates

* Warehouse

* Tamper Evident Labels

Pharmaceutical

* Prescriptions

* Laboratory

* Warning Signs

Commercial

* Nutrition/Product Contents

* Security/ID Tags

* Graphic Design Compositions

Manufacturing

* Model and Serial Number Tags

* Machine and Parts Label

* Safety Signs

For further information, contact our Local Offices around the world.

Specifications and body color differ country to country.