



GOV-TA-0002

Documentation for

SFF TA TWG Editor's Guide

Rev 1.0b January 21, 2019

This guide provides editors of SFF TA TWG documents with supplementary information to aid in the creation of new documents and in the revision of existing documents. It describes the content that is included in each section of an SFF TA TWG specification and is best used in conjunction with the SFF TA TWG document template. Questions about the content of this document should be directed to the SNIA Technical Council Managing Director at tcmd@snia.org.

Revision History:

- Rev 1.0 *November 11, 2018*
 - First publication
- Rev 1.0a *January 17, 2019*
 - Added document number (GOV-TA-0002)
 - Added revision history
 - Updated formatting
- Rev 1.0b *January 21, 2019*
 - Corrected section numbering

Contents:

- 1 Overview.....3
- 2 Common Document Elements.....3
 - 2.1 Guidelines for Style: Figures, Tables, and Formatting3
 - 2.2 Guide to Using the SFF Document Template3
 - 2.3 Revision History3
 - 2.4 Scope3
 - 2.5 References and Conventions3
 - 2.5.1 Industry Documents.....3
 - 2.5.2 Sources4
 - 2.5.3 Conventions.....4
 - 2.6 Keywords, Acronyms, and Definitions4
 - 2.7 Guidelines for Converting to Newer Template Versions4
 - 2.8 Publishing Documents to PDF.....5
 - 2.9 Providing Documents to the SFF TA TWG Chair5
- 3 Connector Specifications5
 - 3.1 Guidelines for Mechanical Drawings.....6
 - 3.2 Guidelines for Test Requirements and Methodologies6
 - 3.3 EIA-364-1000 Testing Details.....6

1 Overview

This document provides informational text that is intended to guide editors of SFF TA TWG documents. Content applies to editors creating new SFF TA TWG documents and editors revising existing documents.

This document is split into separate sections. Some sections apply to SFF TA TWG documents in general, and some apply to connector specifications specifically.

2 Common Document Elements

The SFF TA TWG Document Template includes an Intellectual Property statement. This statement should be included in all SFF TA TWG Specifications (SFF-#### or SFF-TA-####). It does not apply to Information (INF) or Reference (REF) documents and therefore should not be included. Note that legacy Information and Reference documents may start with the SFF designation (SFF-####) even though they are not specifications and therefore should not include the Intellectual Property statement. If the Intellectual Property statement is included in any document, it is to appear at the top of page 2 and is to remain unchanged.

The subsections listed below apply to all SFF TA TWG Specifications (SFF documents), Information documents (INF), and Reference documents (REF). The following sections are included on page 2 in the SFF Document Template (after the Intellectual Property statement, if applicable) and are to remain unchanged:

- Copyright
- Disclaimer
- Foreword

2.1 Guidelines for Style: Figures, Tables, and Formatting

Refer to the SFF TA TWG Style Guide for style information pertaining figures, tables, and formatting.

2.2 Guide to Using the SFF Document Template

The SFF TA TWG Document Template contains several subsections. The following information applies to each of these sections. Editor's notes are included throughout the template and are shown in green text.

2.3 Revision History

Revision history tracking (document number, date, and a summary of the changes since the last version) is maintained for all draft and published revisions of documents. The date reflects the date the draft or published version is posted. Refer to the SFF TA TWG Process Guide for more information. Upon publication, the changes through all the drafts are condensed into one heading for the major/minor revision listed in the history. For example, drafts 1.3.1, 1.3.2, and 1.3.3 get condensed into one heading for 1.4 once published. Duplicate or insignificant revision history entries may be omitted when appropriate.

2.4 Scope

The document scope lists the document's contents; e.g. connector overview, mechanical description, performance testing requirements, implementation guidelines, etc. Edit this section as needed.

2.5 References and Conventions

2.5.1 Industry Documents

This section lists other documents specifically identified within the body of the SFF document. Referenced documents are to be listed in alphanumeric order by alphanumeric designation (e.g. INCITS 478, REF-TA-1011, etc.). The document title should also be included following the designation. Refer to the SFF Document Template for formatting guidelines.

2.5.2 Sources

This section identifies the sources associated with each of the industry documents referenced in the previous section. Sources are listed in the template for the most frequently referenced documents in the SFF Document Template. If there are no documents listed that are associated with a particular source, that source should be deleted. If a source is not listed for a referenced industry document, it should be added, following the format provided in the SFF Document Template.

2.5.3 Conventions

The SFF TA TWG Document Template lists conventions, which are identified by the following categories:

- Order of precedence
- Lists
- Dimensioning conventions
- Numbering conventions

Any of these subsections that do not apply to the document should be deleted. Note: it is very unlikely that order or precedence would ever be deleted.

2.6 Keywords, Acronyms, and Definitions

This section lists keywords, acronyms, and definitions used throughout the document. Acronyms and definitions may be modified as needed, and those not listed in the SFF TA TWG Document Template should be added to the appropriate subsection. Keywords, acronyms, and definitions not relevant to the specification should be removed.

2.7 Guidelines for Converting to Newer Template Versions

When upgrading older SFF TA TWG documents to the newer template, it is recommended that the template upgrade take place prior to revising any of the content (i.e., do not Track Changes during these steps). The editor is strongly advised to copy document content into the template opposed to trying to recreate the template.

The following guidelines are provided to assist the editor when converting to the new template. Note that deviations to these guidelines are acceptable to preserve section numbers, table numbers, etc. that are referenced by other documents:

- Add the document title on the title page, in the footer, and in the document properties.
- Revise the Rev number on the title page and in the header. Refer to the SFF TA TWG Process Guide for information on document numbering.
- Create all section headings; this allows the Table of Contents to correctly update upon completion.
 - o Click View > Check the box for Navigation Pane.
 - o Right click on headings in the Navigation Pane to add/ delete, promote/ demote headings.
- Copy and paste content into the new document section by section (don't forget the Abstract on the cover page). Copying more than one section at a time will likely cause issues, particularly with section headings. It is also recommended that tables and figures be copied over separately.
- Add captions to tables and figures if not copied over (right click > Add caption; this allows lists of figures and tables to updated without additional input from the editor).
- Add/ remove/ revise content in Section 2 (References and Conventions) and Section 3 (Keywords, Acronyms, and Definitions) as needed.
- When creating references to figures, tables, and section headings in the document text, insert linked references (ctrl + click follows the link). To insert linked references, click Cross-Reference on the References tab, choose the appropriate reference, and click Insert.

- All text highlighted in yellow should be updated by the editor. Highlighted text is used to indicate that the editor should provide information (such as a document title, revision number, abstract, etc.) or that the editor should choose one of several listed options (e.g., if latching force or latched mating force shall be tested per the performance requirements).
- Update Table of Contents / Figures / Tables (ctrl + A, F9, click Update Entire Table for each dialogue box that appears; make sure Track Changes is turned off for this step).

Once all content is copied into the template, the editor may choose to use the Track Changes feature as content is revised. Update Revision History as needed.

2.8 Publishing Documents to PDF

When publishing a document to a PDF version:

- For draft documents, add an entry to the Revision History for the new draft. For published documents, condense the Revision History (refer to Section 2.3).
- Remove line numbers and all Editor's Notes (green text) from the document.
- Update the Table of Contents / Figures/ Tables (with track changes turned OFF, Ctrl +A, F9, click Update Entire Table for all dialogue boxes that appear).
- Enable bookmarks using headings. This feature is enabled when saving. From the save menu, change the file type to PDF, click Options and choose Create Bookmarks Using Headings.
- Save the document as a PDF. NOTE: The same source file may be used to create a change bar PDF and a clean PDF (if track changes was enabled during editing). When saving the PDF, toggle the visibility of the changes from the Tracking bar on the Review tab.

2.9 Providing Documents to the SFF TA TWG Chair

For draft documents, the editor is required to provide the following to the SFF TA TWG Chair:

- Source documents (e.g. Word versions) should be shared with the Chair for draft documents
- At least one PDF of the draft document
- NOTE: If a change bar version is to be shared with the SFF TA TWG, it is recommended that a clean version also be provided. In this case, two PDFs should be provided to the Chair so that they may both be shared.

For published documents, the editor is required to provide the following to the SFF TA TWG Chair:

- One source document (e.g. Word version); all changes should be accepted within the source document
- One PDF version of the approved document

3 Connector Specifications

Connector specifications typically include the following:

- General description
- Pin numbering
- Definition of datums
- Connector/ cage/ module descriptions
- Implementation guidelines (e.g. bezel opening, footprints, etc.)
- Test requirements and methodologies

If additional sections are needed, they may be added where appropriate. If any of the sections listed above are not needed, they may be omitted.

3.1 Guidelines for Mechanical Drawings

Mechanical drawings should be clear and easy to read. Drawings and text in drawings should be big enough to be legible. Lines in figures should be thick enough such that they don't disappear in PDF versions, particularly when zooming in. Refer to the SFF TA TWG Style Guide for more information on formatting figures in SFF TA TWG documents.

3.2 Guidelines for Test Requirements and Methodologies

SFF Connector Specifications typically identify certain performance requirements that are required to be satisfied for compliance (e.g. durability, field life, field and storage temperatures, etc.). This information serves as a product specification, as a test methodology, and as pass/fail criteria when validating the connector performance. Performance criteria are typically self-certified by connector suppliers and are summarized in Table 8-1 in the SFF Document Template (NOTE: the table number will likely change as the template is modified).

Validation of the performance criteria listed in Table 8-1 is typically achieved by testing according to the procedures described by EIA-364-1000. However, EIA-364-1000 leaves some test methods and other options to be identified by the controlling document, which in this case, is the SFF Connector Specification. Table 8-2 in the SFF Document Template identifies any test methods, test conditions, or testing thresholds that are necessary to conduct testing per EIA-364-1000. Additional table entries may be added as needed. Unneeded entries may be omitted.

If there are any other performance requirements that are validated outside of the EIA-364-1000 testing suite (e.g. mating/ unmating force testing), they should be included in Table 8-3 of the SFF Document. The editor is instructed to identify any industry documents and testing details that are needed to replicate testing including test procedure, test method, test duration, load rates, pass/ fail criteria, etc.

3.3 EIA-364-1000 Testing Details

The following information is provided to complement the information provided in EIA-364-1000. Test Groups 1, 2, and 3 are required of all connectors tested per EIA-364-1000. The additional information captured in Table 8-1 of the SFF TA TWG Document Template dictates whether any of the four remaining Test Groups require testing:

- Plating type:
 - o Precious: Test Group 4 required (test options must be specified and recorded); Test Group 5 optional if < 0.38 microns of gold
 - o Non-precious: Include Test Group 5
- Surface treatment:
 - o Lubricated: Test Group 6 required
(if lubricant is present, do not remove during sample preparation)
 - o Non-lubricated: Test Group 6 optional
- Wipe length:
 - o Less than 0.127mm: Test Group 6 required
 - o Greater than 0.127mm: Test Group 6 optional
- Durability cycles: Used to determine the number of cycles that a component is subjected during durability and pre-conditioning tests
 - o Less than 50 cycles: Test Group 7 optional
 - o Greater than 50 cycles: Test Group 7 required

Some of the test procedures identified by EIA-364-1000 include options and pass/fail criteria that are specified by the controlling document (e.g. the SFF TA TWG document). These tests are summarized in

Table 8-2 of the SFF TA TWG Document Template. The following information is provided to the editor for reference:

EIA-364-1000 Tests:

- **Mechanical/ Physical Tests:**
 - o Durability (also applies to Durability (Preconditioning)): A procedure to simulate the effects of mating and unmating a connector system over its lifetime
 - Number of durability cycles tested during EIA-364-1000 test sequences is determined from the number of durability cycles expected throughout the connector's lifetime, which is listed in the controlling document (SFF document)
 - Durability requirements may be listed separately for cage, connector, and module (e.g. replace module after 50 cycles, continue testing cage and connector to 100 cycles)
 - Editor to specify how testing is conducted (e.g. with cage, connector, and module; with or without heatsinks; with latches engaged or disengaged)
 - Refer to EIA-364-1000 for number of cycles required (Note: Fewer cycles are required for preconditioning tests)
 - o Vibration: A procedure to test the integrity of a connector system design
- **Environmental Tests:**
 - o Cyclic Temperature & Humidity: A procedure to determine the effect of high heat and humidity on a connector
 - o Mixed Flowing Gas (MFG): A procedure to evaluate a connector by means of pore corrosion in a corrosive environment; test option must be identified
 - o Dust Contamination: A procedure to evaluate the susceptibility of a connector to the effects of dust accumulation at the separable interface.
 - o Temperature Life (also applies to Temperature Life (Preconditioning)): A procedure to evaluate a connector at elevated temperatures
 - Field Temperature specified in the controlling document (SFF document) dictates test conditions
 - Refer to Table 8 in EIA-364-1000 for details on Temperature Life testing; refer to Table 9 in EIA-364-1000 for details on Temperature Life (Preconditioning) testing
 - o Thermal Cycling (Disturbance): A procedure for a connector in an extreme condition; intended to create small mechanical motions
 - o Thermal Shock: A procedure to test a connector in extreme conditions to simulate probable storage, transportation, and application conditions
- **Electrical Tests:**
 - o Low Level Contact Resistance (LLCR): A procedure to be used to specify pass/fail criteria within a test sequence
 - The first LLCR measurement in a Test Group is used to determine the baseline measurement; there are no restrictions on the baseline measurement unless otherwise noted in the controlling document (SFF document)
 - Subsequent measurements in a Test Group are compared against the baseline; subsequent measurements are required to be within the deviation from baseline specified by the controlling document (SFF document)

- Dielectric Withstanding Voltage (DWV): A procedure to determine if contact spacing and insulating material are adequate
 - Unless otherwise specified, voltage applied during DWV testing should be 75% of the minimum breakdown voltage
 - Breakdown voltage is considered 3x greater than the operating rated voltage specified by the controlling document (SFF document)

Any required performance metrics that fall outside of EIA-364-1000 are included in Table 8-3 of the SFF Document Template. The following provides more information for tests that are commonly required of SFF connectors; **THIS IS NOT AN EXHAUSTIVE LIST.**

Supplementary Tests:

- Mechanical:

- Mating Force: A procedure to determine the amount of force needed to mate a module with a connector when latches (if applicable) are deactivated (locked out or otherwise removed)
 - Editor to specify if testing is to be conducted with cage, connector, module, and/or heat sinks
- Unmating Force: A procedure to determine the amount of force needed to separate a module from a connector when latches (if applicable) are deactivated (locked out or otherwise removed)
 - Editor to specify if testing is to be conducted with cage, connector, module, and/or heat sinks
- Latched Mating Force: A procedure to determine the amount of force needed to mate a module with a connector with latches operational (latches not locked out)
 - Editor to specify if testing is to be conducted with cage, connector, module, and/or heat sinks
 - Does not apply to connectors without latches; use Mating Force
- Latched Unmating Force: A procedure to determine the amount of force needed to separate a module from a connector while releasing the latch mechanism (e.g. pull on pull tab to deactivate latch and remove module from connector)
 - Editor to specify if testing is to be conducted with cage, connector, module, and/or heat sinks
 - Does not apply to connectors without latches; use Unmating Force
- Latch Retention: A procedure to determine if the latching mechanism is able to withstand the specified force (min or min and max); latches are to remain engaged throughout testing
- Cable Strain (Pull or Flex): A procedure to determine if the bulk cable is able to retain the specified force before coming loose from the module shell
- Connector and/or Cage Retention: A procedure to determine if a connector and/or cage is able to withstand the specified, vertical force without removing the connector and/or cage from a host board
- Cable Flex: A procedure to determine if a bulk cable is able to withstand a defined number of flex cycles when in use
- Cable Bend Radius: A procedure to determine if a bulk cable is able to withstand a defined bend radius during use
- Tether Testing: A procedure to determine if a bulk cable is able to withstand a defined amount of weight and flex when in use

- **Environmental:**
 - o Storage Temperature: A procedure to verify that a connector is capable of withstanding a specified storage temperature
 - o Storage Humidity: A procedure to verify that a connector is capable of withstanding a specified storage humidity
- **Electrical:**
 - o Current: A procedure to verify that a connector is capable of carrying a specified current