SEMI E173-0415
SPECIFICATION FOR XML SECS-II MESSAGE NOTATION (SMN)

This Standard was technically approved by the Information & Control Global Technical Committee. This edition was approved for publication by the global Audits and Reviews Subcommittee on January 5, 2015. Available at www.semiviews.org and www.semi.org in April 2015.

Table of Contents

1 Purpose 2

2 Scope 2

3 Limitations 2

4 Referenced Standards and Documents 2

5 Terminology 3

6 Conventions 3

7 Requirements 4

8 Test Methods 12

APPENDIX 1 13

RELATED INFORMATION 1 15

SUPERSEDED

Documents Document Sharing Hub

Full document details: SEMI E173-0415

1 Purpose

1.1 The content of SECS-II messages are defined in SEMI Standard E5, SEMI Equipment Communication Standards 2 Message Content (SECS-II). SECS-II messages can be transmitted to and from and equipment using either the protocol defined in SEMI E4, Equipment Communication Standards1 Messages Transfer (SECS-I) or the protocol defined in SEMI E37 High Speed Message Transfer (HSMS) Generic Services.

1.2 The purpose of this Specification is to define a standardized notation to represent the content of SECS-II messages or the total message when SECS-II messages are sent or received using the SECS-I or HSMS protocol. SECS-II Message Notation (SMN) is intended for use when documenting and logging SECS-II messages. The notation is intended to be used when documenting the purpose, structure and sequence of SECS-II messages. The notation is also intended to be used when logging SECS-II message communication traffic.

2 Scope

2.1 SMN as described in this Specification standardizes an XML notation that can be used for both the logging and documentation of SECS-II messages. The rules of this notation are primarily specified using an XML schema. Any logging and documentation that comply with SMN are created in an XML format that passes SMN schema validation.

2.2 When SECS-II message transactions are logged using SMN, the XML represents the content, structure, order and additional transaction details of sent and received messages. Logging might include only the SECS-II message content. Logging might also include the protocol message header.

2.3 When documenting SECS-II messages, the XML represents the content, structure and description of the SECS-II messages. Message scenarios can also be documented to indicate the order and content of messages in a sequence. Typically, SECS-II documentation includes only the SECS-II message content. Some of the elements and attributes in the schema file are exclusively for documenting SECS-II messages.

NOTICE: SEMI Standards and Safety Guidelines do not purport to address all safety issues associated with their use. It is the responsibility of the users of the Documents to establish appropriate safety and health practices, and determine the applicability of regulatory or other limitations prior to use.

3 Limitations

3.1 The SMN schema is not intended to be used to implement a communication protocol for sending or receiving SECS-II messages.

4 Referenced Standards and Documents

4.1 *SEMI Standards and Safety Guidelines*

SEMI E4 — SEMI Equipment Communication Standard 1Message Transfer (SECS-I)

SEMI E5 — SEMI Equipment Communication Standard 2 Message Content (SECS-II)

SEMI E37 — High-Speed SECS Message Services (HSMS) Generic Services

4.2 *W3C Standards*[1]

Extensible Markup Language (XML) 1.1 (Second Edition) — W3C Recommendation 16 August 2006; http://www.w3.org/TR/xml11/

XML Schema Definition Language (XSD) 1.1 Part 1: Structures — W3C Recommendation 5 April 2012

XML Schema Definition Language (XSD) 1.1 Part 2: Datatypes — W3C Recommendation 5 April 2012

NOTICE: Unless otherwise indicated, all documents cited shall be the latest published versions.

[1] World Wide Web Consortium, Massachusetts Institute of Technology (MIT), 32 Vassar Street, Room 32-G515, Cambridge, MA 02139, USA. Telephone 617.253.2613; Fax: 617.258.5999; http://www.w3.org

SUPERSEDED
Documents
Document Sharing Hub
Full document details: SEMI E173-0415

5 Terminology

5.1 *Abbreviations and Acronyms*

5.1.1 *SMN* — SECS-II Message Notation

5.1.2 *W3C* — Worldwide Web Consortium

5.1.3 *XML* — eXtensible Markup Language

5.1.4 *XSD* — XML Schema Definition

5.2 *Definitions*

5.2.1 *SECS-II Message Notation (SMN)* — XML notation that complies with the requirements in this Specification including the requirements in the Complementary File.

5.2.2 *eXtensible Markup Language (XML)* — a markup language used for representing data rich with context and content in documents and in communications. XML is an extension of SGML, a document-oriented markup language. It was created by W3C for use on the Internet. XML can represent object-oriented structures.

5.2.3 *XML Schema Definition (XSD)* — a schema that describes the structure of an XML document. A schema file has an XSD file extension.

6 Conventions

6.1 *Requirements Identification*

6.1.1 The following notation specifies the structure of requirement identifiers.

6.1.1.1 The following requirements prefix format is used at the beginning of requirement text. See Table 1 for the format notation of the requirements prefix.

- [Esss.ss-RQ-nnnnn-nn]

6.1.1.2 To mark the end of the requirement text the following suffix format is used.

- [/RQ]

6.1.1.3 Requirements in the body text are highlighted with a border and light green background (may appear gray in black and white printouts).

[Esss.ss-RQ-nnnnn-nn] Requirement text. [/RQ]

Table 1 Requirement Identifiers

Format Notation	*Purpose*
Esss.ss	SEMI Standards Specification identifier. Examples: E087.00, E087.01, E134.00.
RQ	Indicates this is a requirement identifier.
nnnnn	Unique five-digit number within this Specification. 90000–99999 are reserved for use by SEMI.
.nn	Two-digit number that indicates version level of the requirement (.00 is used for the first version of a requirement).
/RQ	Indicates the end of a requirement.

6.1.2 Requirements in tables are delimited in one of two ways.

6.1.2.1 Where the requirement occupies an entire row in the table, the requirement ID is placed in column 1. No '[/RQ]' is used to mark the end of the requirements text in this case. The table may also contain rows that are not requirements. In this case, the column 1 cell is left blank.

6.1.2.2 Nonrequirements text related to a requirements row may be included in an adjacent row. The relationship between the rows is indicated by a broken line separating the two.

SUPERSEDED

Documents Document Sharing Hub
Full document details: SEMI E173-0415

6.1.2.3 Where the requirement occupies only one cell, the text in the cell includes the requirement ID prefix and suffix similar to requirements in the body text.

6.1.2.4 No cell in a table will contain both requirement and nonrequirement text.

6.1.2.5 Cells that contain requirements are shaded light green.

6.1.2.6 Table 2 provides an example of requirements in a table. Note that in this example, the same requirement is presented in two alternative formats. In practice, mixing the two approaches in the same table is not typically done.

Table 2 Example Table with Requirements

RequirementID	*Statement*	*Additional Detail*
Esss.ss-RQ-nnnnn-nn	The light shall be blue.	There shall be no similar color in the light panel.
	The blue light is typically placed at the leftmost position in the light panel.	
	[Esss.ss-RQ-nnnnn-nn] The light shall be blue. There shall be no similar color in the light panel. [/RQ]	The blue light is typically placed at the leftmost position in the light panel.

6.1.3 Only text marked with the requirement identifier is a requirement of this Specification.

6.1.3.1 Clarification, examples, and related recommendations may be provided near a requirement, but are not part of the requirement.

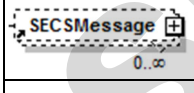
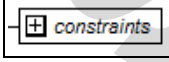
6.1.3.2 Note that the word 'should' is used in some nonrequirements text and it denotes a recommendation or a best practice, not a requirement.

6.1.4 Parent-child relationships of requirements are noted in the tables in Appendix 1. Where a parent requirement includes conditions or selection criteria, these are passed to their children. For example, if a parent requirement is stated to apply only to photolithography equipment, any child requirements also apply only to such equipment. The condition need not be restated for each child requirement.

6.2 *Schema Diagrams*

6.2.1 The schema diagrams in this specification use graphical representations of XML schemas created by Altova GmbH.[2]

Table 3 Schema Diagram

Diagram Feature	*Description*
	Denotes a required ordered sequence of the right hand elements. (sequence)
	Denotes an element that contains other elements or attributes. Cardinality may be shown at the bottom right. (element)
	Denotes the existence of XML constraints such as Unique or KeyRef elements. (constraints)

7 Requirements

7.1 The usage of SECS-II Message Notation is described in this section.

7.2 Most requirements for SECS-II notation are defined within an XML schema designated as a Complementary File to this Specification. The Complementary File is part of this Specification.

[2] The images in Figures 1, 2, 3, 4, 5 and 6 were created using Altova XMLSpy®. Copyright 2007-2011 Altova GmbH.

SUPERSEDED
Documents
Document Sharing Hub
Full document details: SEMI E173-0415

[E173.00-RQ-00001-00] SMN text and files shall comply with all of the requirements in this Specification including the requirements specified within the Complementary File, E173-0315-SECSIIMessageNotation-Schema.xsd. [/RQ]

7.2.1 Not all requirements can be validated by an XML schema alone. Additional requirements appear in the schema as xs:annotation elements.

[E173.00-RQ-00002-00] The SMN implementer shall follow all textual instructions and requirements embedded within the XML schema. [/RQ]

7.2.2 Most requirements for using SMN are defined by the XML schema itself. The process of checking to see whether an XML document conforms to an XML schema is called validation. Implementers should validate the use of SMN using the XML Schema. There are numerous tools available for validating XML against a schema to check that the XML is well-formed.

[E173.00-RQ-00003-00] SMN text and files shall successfully validate against the SMN schema file. [/RQ]

7.2.3 The tables below in the next section indicate whether an element or attribute is intended to be used when logging SECS-II messages and when documenting SECS-II messages. Most elements and attributes are optional so that users can pick and choose which items are useful for a particular application.

7.2.4 XML files can use different character sets. The character set is specified in the first line using the encoding attribute, like this: <?xml version="1.0" encoding="UTF-8"?>

[E173.00-RQ-00004-00] XML data using SMN shall be encoded in the UTF-8 character set. [/RQ]

7.2.5 When logging messages in SMN, implementers generate the XML from the SECS-II messages. It is also possible for implementers to create applications that convert SMN into SECS-II messages.

7.3 *XML Schema Overview*

7.3.1 The tables and figures in this section list the various elements and attributes defined by the XML schema. The documentation for each element and attribute is contained within the XML schema. These appear in the schema as xs:annotation elements.

7.3.2 *SECSMessageScenario*

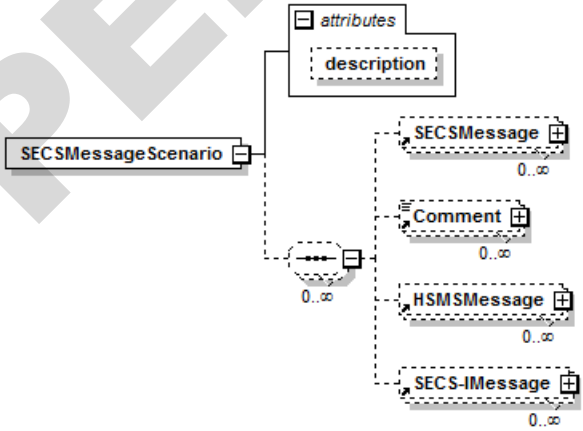


Figure 1
Element SECSMessageScenario

7.3.2.1 The SECSMessageScenario element encapsulates a sequence of SECS-II Messages using element SECSMessage; whether creating a SECS-II message log file or creating documentation on how to implement a specific message scenario. The SECSMessageScenario element also allows comments. A SECSMessageScenario can also include protocol level messages.

SUPERSEDED

Documents Document Sharing Hub
Full document details: SEMI E173-0415

7.3.2.2 Either HSMS or SECS-I protocol level messages can be embedded anywhere within a sequence by using the HSMSMessage and SECS-IMessage elements. HSMSMessage and SECS-IMessage elements can be used to log the entire message header and message data in its original format as sent or received. It is unlikely that elements SECS-IMessage and HSMSMessage would be used in the same sequence.

7.3.2.3 Elements SECSIIMessage and HSMSMessage can be used in the same sequence.

[E173.00-RQ-00005-00] When both a SECSMessage and HSMSMessage entries are used in a sequence for the same message, the HSMSMessage entry shall be placed before the corresponding SECSMessage entry. [/RQ]

7.3.2.4 Elements SECSIIMessage and SECS-IMessage can be used in the same sequence.

[E173.00-RQ-00005-00] When both a SECSMessage and SECS-IMessage entries are used in a sequence for the same message, the SECS-IMessage entry shall be placed before the corresponding SECSMessage entry. [/RQ]

7.3.2.5 The table below indicates which SECSMessageScenario elements and attributes are intended for logging purposes and which are intended for documentation purposes.

Table 4 SECSMessageScenario

Element/Attribute	*Logging*	*Documentation*
description	Yes	Yes
SECSMessage	Yes	Yes
Comment	Yes	Yes
HSMSMessage	Yes	Yes
SECS-IMessage	Yes	Yes

SUPERSEDED

Documents
Document Sharing Hub
Full document details: SEMI E173-0415