

INTERNATIONAL STANDARD

IEC
61182-2

First edition
2006-09

**Printed board assembly products –
Manufacturing description data
and transfer methodology –**

**Part 2:
Generic requirements**

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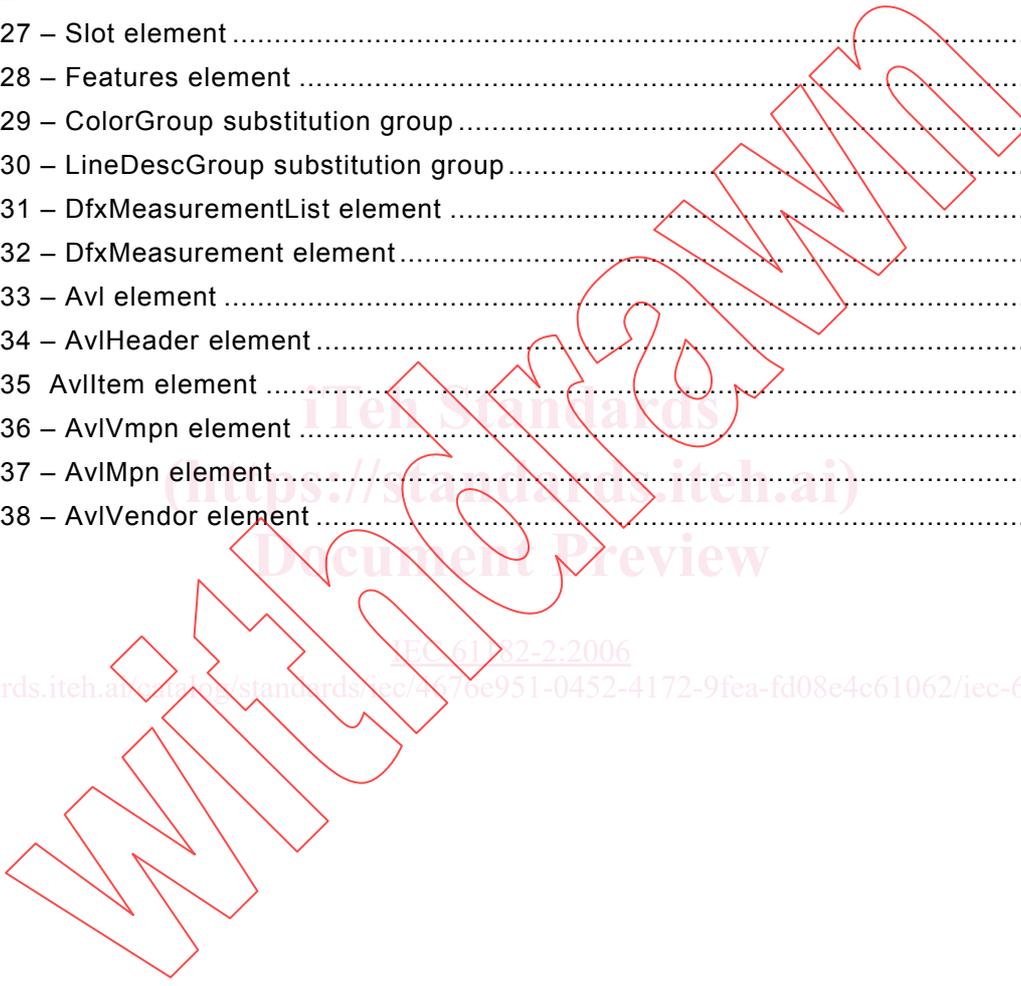
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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**PRINTED BOARD ASSEMBLY PRODUCTS –
MANUFACTURING DESCRIPTION DATA AND
TRANSFER METHODOLOGY –**

Part 2: Generic requirements

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International Standard IEC 61182-2 has been prepared by IEC technical committee 93: Design automation.

The text of this standard is based on the following documents:

CDV	Report on voting
93/211/CDV	93/231/RVC

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this standard may be issued at a later date.

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PRINTED BOARD ASSEMBLY PRODUCTS – MANUFACTURING DESCRIPTION DATA AND TRANSFER METHODOLOGY –

Part 2: Generic requirements

1 Scope and object

This part of IEC 61182 specifies the XML Schema that represents the intelligent data file format used to describe printed board and printed board assembly products with details sufficient for tooling, manufacturing, assembly, and inspection requirements. This format may be used for transmitting information between a printed board designer and a manufacturing or assembly facility. The data is most useful when the manufacturing cycle includes computer-aided processes and numerical control machines.

The data can be defined in either English or International System of Units (SI) units.

1.1 Focus and intent

The generic format requirements are provided in a series of standards focused on printed board manufacturing, assembly, and inspection testing. This standard series consists of a generic standard (IEC 61182-2) that contains all the general requirements. There are four sectional standards that are focused on the XML details necessary to accumulate information in the single file, that addresses the needs of the design, fabrication, assembly and test disciplines producing a particular product.

The sectional standards (IEC 61182-2-1 through IEC 61182-2-4) paraphrase the important requirements and provide suggested usage and examples for the topic covered by the sectional standard.

1.2 Notation

Although the data would be contained in a single file, the file can have different purposes as described in Clause 4. The XML Schema used for this standard follows the notations set forth by the W3C and is as follows:

- element – Element appears exactly one time
- element? – element may appear 0 or 1 times
- element* – element may appear 0 or more times
- element+ – element may appear 1 or more times

Any IEC 61182-2 file is composed of a high level element IEC 61182-2 that contains up to six sub-elements:

- Content – information about the contents of the 258X file
- LogisticHeader – information pertaining to the order and supply data
- HistoryRec – change information of the file
- Bom – Bill of Materials (Material List) information
- Ecad – Computer Aided Design (engineering) information
- Avl – Approved Vendors List information

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60194, *Printed board design, manufacture and assembly – Terms and definitions*

IEC 61188-5-1, *Printed boards and printed board assemblies – Design and use – Part 5-1: Attachment (land/joint) considerations – Generic requirements*

IEC 61188-5-2, *Printed boards and printed board assemblies – Design and use – Part 5-2: Attachment (land/joint) considerations – Discrete components*

IEC 61188-5-3, *Printed boards and printed board assemblies – Part 5-3: Sectional design and use requirements – Attachment (land/joint) considerations – Components with Gull-wing leads on two sides¹*

IEC 61188-5-4, *Printed boards and printed board assemblies – Design and use – Part 5-4: Sectional requirements – Attachment (land/joint) consideration – Components with J leads on two sides²*

IEC 61188-5-5, *Printed boards and printed board assemblies – Design and use – Part 5-5: Sectional requirements – Attachment (land/joint) considerations – Components with Gull-wing leads on four sides²*

IEC 61188-5-6, *Printed boards and printed board assemblies – Design and use – Part 5-6: Attachment (land/joint) considerations – Chip carriers with J-leads on four sides*

IEC 61188-5-8, *Printed boards and printed board assemblies – Design and use – Part 5-8 : Sectional Requirement – Attachment (land/joint) considerations – Area array components (BGA, FBGA, CGA, LGA)²*

3 Documentation conventions

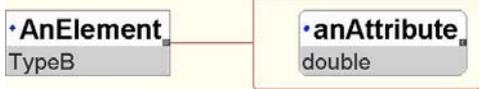
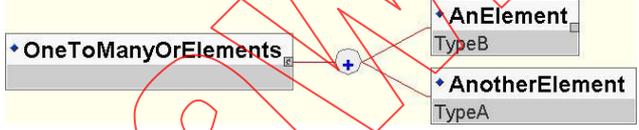
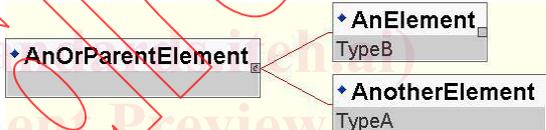
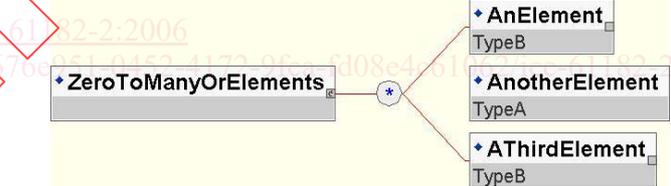
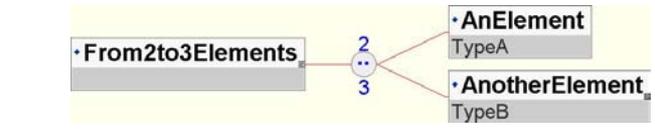
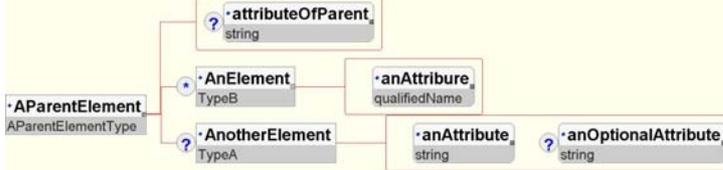
The XML file format standard and the XML Schema definition language standard, as defined by the World Wide Web Consortium (W3C), have been adopted by IEC for use in the IEC 61182 series of standards.

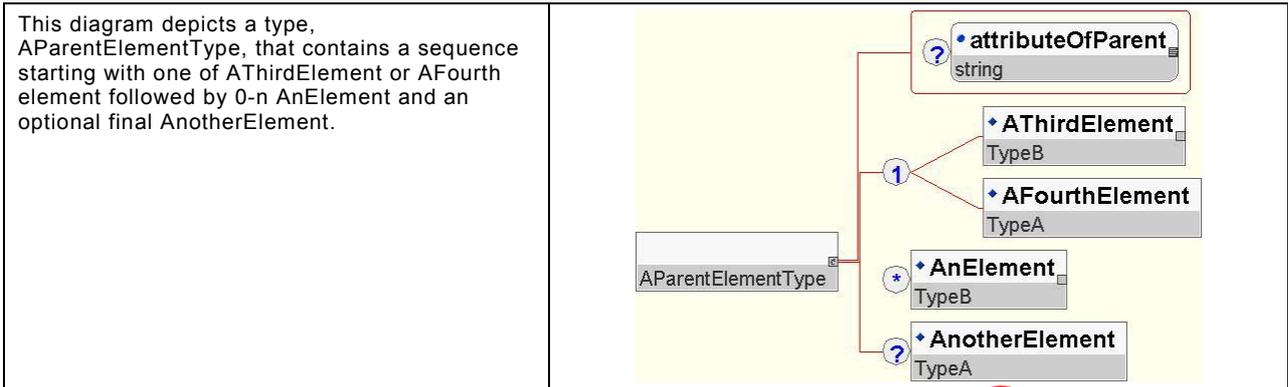
In addition to the text based schema notation, this document provides graphical representation of the structure of the file format. The XML diagrams are designed to effectively illustrate the structure and cardinality of elements and attributes that make up any IEC 61182-2 file. The notation in the graphics does not provide a complete visualization of the schema definition for the file format, but it does provide a good top down overview. Should there be any conflict between the graphical notation and the schema notation, the authoritative definition is the schema notation.

Table 1 provides an overview of the graphical notation used in the document.

¹ To be published.

Table 1– Graphical notation overview

<p>This diagram depicts an element named AnElement that is of type TypeB. There is one attribute, named anAttribute, that is of type double. The attribute is required.</p>	
<p>Example: <code><AnElement anAttribute="14.44e-3"/></code> Note that all attribute values must be enclosed in quotes, regardless of type.</p>	
<p>This diagram depicts an element with two attributes. The attribute anAttribute is required. The "?" in the circle indicates that the second attribute, anOptionalAttribute, is optional. Both attributes are of type string.</p>	
<p>Examples: <code><AnotherElement anAttribute="red" anOptionalAttribute="a string" /></code> <code><AnotherElement anAttribute="blue" /></code></p>	
<p>The element OneToManyOrElements is the parent of an unordered list of one or more instances of the elements AnElement and AnotherElement. The "+" indicates the occurrence is one to many and the angled lines indicate this is a choice relationship (" ") between the children elements.</p>	
<p><code>< OneToManyOrParentElement >...</code></p>	
<p>The absence of an occurrence bubble declares that one and only one occurrence are allowed. The AnOrParentElement can have one of AnElement or AnotherElement as a child element.</p>	
<p>The "*" in the occurrence bubble indicates the choice is from 0 to many.</p>	
<p>This diagram depicts an element, From2to3Elements. The element has no type and no attributes. It can have from 2 to 3 sub-elements of either AnElement or AnotherElement.</p>	
<p>This diagram depicts an element, AParentElement, of type AParentElementType. This element has one attribute, attributeOfParent, which is optional. The lines with square corners indicate that occurrences of AnElement and AnotherElement must appear in the order by the illustration on the right where the top element is addressed first and AnotherElement is addressed secondly.</p>	



4 Requirements

The XML Schema contained in this document describes the structure of a generic computer-aided manufacturing IEC 61182-2 exchange format. The document specifies data elements specifically designed to establish the information exchange related to the data needed by printed board manufacturing, and assembly including inspection of those products.

The XML Schema defines the configuration of mandatory and optional elements, as well as mandatory and optional attributes. The Top Level (TopElement) of the schema contains six major elements. The schema notation specifies that the 6 top-level elements are required to appear in the order shown in Figure 1. The order of appearance in the file is significant. For instance, the appearance of graphics on a layer is dependent on the order of appearance in the file. The order is also important because elements often reference information that is defined elsewhere in the file in order to eliminate redundancy within the file. The file is structured to allow all references to be resolved in one pass.

An implementation of the XML Schema must be able to facilitate the reading and/or writing of all characteristics defined within the requirements stated in the Mode function of this standard. Some tools may have only read capability; some may have only write capability. Some tools may have both read/write capability. All schema defined in the standard as mandatory (1-1, 1-n occurrences) shall be executed as appropriate. Tool providers shall identify their capability by Mode Level (Full, Design 1, 2 or 3, Fabrication 1, 2, or 3, etc.) plus 2581R (read-only); 2581W (write-only); or 2581RW (read and write).

Each element has a specific function or task. Accordingly, the information interchange for a specific purpose is possible only if that element is populated. The ability to select those characteristics that are appropriate for a given task makes the schema a robust methodology for defining only those areas and characteristics that are necessary to produce a given product. Figure 1 shows the children elements of the Top Element IEC 61182-2.