

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE



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**Printed boards and printed board assemblies – Design and use –  
Part 7: Electronic component zero orientation for CAD library construction**

**Cartes imprimées et cartes imprimées équipées – Conception et utilisation –  
Partie 7: Orientation nulle des composants électroniques pour l'élaboration  
d'une bibliothèque CAO**



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COMMISSION

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**PRINTED BOARDS AND PRINTED BOARD ASSEMBLIES –  
DESIGN AND USE –****Part 7: Electronic component zero orientation  
for CAD library construction**

## FOREWORD

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International Standard IEC 61188-7 has been prepared by IEC technical committee 91: Electronics assembly technology.

This bilingual version (2019-09) corresponds to the monolingual English version, published in 2017-04.

This second edition cancels and replaces the first edition published in 2009. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) Figure 1 has been corrected;
- b) the term "rectangle" has generally been replaced by "polygon";

c) level B has been indicated as preferred level for new libraries.

The text of this International Standard is based on the following documents:

CDV	Report on voting
91/1382/CDV	91/1428/RVC

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

The French version of this standard has not been voted upon.

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

A list of all parts of the IEC 61188 series, under the general title *Printed boards and printed board assemblies – Design and use*, can be found on the IEC website.

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

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- withdrawn,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

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## INTRODUCTION

One of the factors of establishing a CAD library component description and land pattern standard is to adopt a fixed zero component orientation so that all CAD images are built with the same rotation for the purpose of assembly machine automation.

The land pattern standards clearly define all the properties necessary for standardization and acceptability of a one world CAD library. The main objective in defining a one world CAD library is to achieve the highest level of electronic product development automation. This encompasses all the processes involved from engineering to PCB layout to fabrication, assembly and test. The data format standards need this type of consistency in order to meet the efficiency that electronic data transfer can bring to the industry.

Many large firms have spent millions of dollars creating and implementing their own unique standards for their own electronic product development automation. These standards are proprietary to each firm and are not openly shared with the rest of the industry. This has resulted in massive duplication of effort, costing the industry millions of man hours in waste and creating industry chaos and global non-standardization.

The main purpose of creating the land pattern standards is to achieve reliable solder joint formation platforms; the reason for developing the data transfer structure is to improve the efficiency with which engineering intelligence is converted into manufacturing reality. Even if the neutral CAD format can drive all the manufacturing machines, it would be meaningless unless the component description standard for CAD land patterns were implemented with some consistency. Zero component orientation has a key role in machine automation.

The obvious choice for global standardization for EE hardware engineering, PCB design layout, manufacturing, assembly and testing processes is to incorporate the standard land pattern conventions. Any other option continues the confusion and additional manual hours of intervention in order to achieve the goals of automation. In addition, the ease of having one system export a file so that another system can accomplish the work can require unnecessary manipulation of the neutral format in order to meet the object of clear, unambiguous software code.

The design of any assembly will continue to permit arrangement and orientation of components at any orientation consistent with design standards. Starting from a commonly understood data capture concept will benefit the entire supply chain.

This standard defines angle and origin point of land patterns for land pattern designing.

# PRINTED BOARDS AND PRINTED BOARD ASSEMBLIES – DESIGN AND USE –

## Part 7: Electronic component zero orientation for CAD library construction

### 1 Scope

This part of IEC 61188 establishes a consistent technique for the description of electronic component orientation, and their land pattern geometries. This facilitates and encourages a common data capture and transfer methodology amongst and between global trading partners.

### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 61188-5 (all parts), *Printed boards and printed board assemblies – Design and use – Part 5-x: Attachment (land/joint) considerations*

### 3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

### 4 Basic rules

#### 4.1 Common rules

Common rules are divided into two groups: level A and level B. The main difference between the rules is the original orientation within the CAD system library. This orientation may be any version that the designer finds useful including his own version; however, when the information is transferred to an assembler, the orientation shall be properly defined without ambiguity or shall be corrected in order that any variation between the different systems are properly matched. This conversion of the CAD data to manufacturing information may include the datum of the board, fabrication panel or assembly array panel and shall have the proper orientation of all components on the board no matter what library was used as the original input.

#### 4.2 General basic rules

The following basic rules apply.

- Components and land patterns are drawn in top view.
- The component point of origin is shown by "+" or "x".