



# **PADS Parts Library ASCII File Format Specification**

**PADS 9.1**

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**Contractor/manufacturer is:**

Mentor Graphics Corporation  
8005 S.W. Boeckman Road, Wilsonville, Oregon 97070-7777.

Telephone: 503.685.7000

Toll-Free Telephone: 800.592.2210

Website: [www.mentor.com](http://www.mentor.com)

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# Chapter 1

## ASCII File Format Specification

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### Introduction

This specification defines the structure and syntax of the Parts Library ASCII export files.

The Parts Library ASCII file format provides a way for other CAD or CAE systems to import and export part and decal information to and from the PADS Parts Library. Using Parts Library ASCII format a user can access library information without accessing the internal databases or source code.

You can convert an entire library, including, part types, part decal descriptions, attributes and graphics into an ASCII file.

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#### Note



The PADS 9.0 library format and PADS 9.0 ASCII format are not backwards compatible with previous library formats.

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### Format Conventions

The format of the ASCII file is important for correct interpretation by the Library Manager software. Use the conventions below when creating or modifying a parts library ASCII file:

- Text shown in bold and uppercase within this specification represents keywords and should appear in the ASCII file as it appears in the format statements. For example:  
  
    \*SIGNAL\*
- Lowercase italic text represents variables. Definitions for variables and allowed ranges of values are given.
- The variable, *name*, represents an arbitrary alphanumeric text entry of a defined number of characters. Alphanumeric characters include all uppercase and lowercase letters, all numbers, and the special characters:  
    `~#\$%^&()\_+ = ; ' " [ ] ? / < > !
- Except for general attributes where uppercase and lowercase characters are both accepted, all other data in the file should be uppercase only.
- All rotations are given in positive fixed-point values, from 0 to 359.999 degrees. The finest precision recognized for rotations is 0.001 degree.
- Optional data is enclosed in brackets ( [ ] ).

**Note:** Including some optional data can make other optional data required.

- All line entries require a final carriage return (press **Enter**). This is not explicitly specified in the format definitions.
- All size and coordinate data are in units of mils (0.001 inch) or millimeters, depending on the units type (Imperial or Metric) of the item being defined. The finest precision recognized for Imperial units is 0.00001 inch or 0.01 mil. The finest precision recognized for metric units is 0.00001 mm.

## Structure of the ASCII File

The Parts Library ASCII file has a different format for each of the four data types that can be exported or imported to and from a Library data type, unlike ASCII-format for PADS Logic and PADS Layout. Each file is dedicated to one data type and contains one or more records. The following four data types are available:

- Drafting Item
- Schematic Decal
- PCB Decal
- Part Type

Each file has a header line to specify the type of file, item type, and version number, followed by the item records and an end of file statement.

## Control Statements

All control statements begin and end with an asterisk (\*).

*PADS-LIBRARY-LINE-ITEMS-V9*	Start of Drafting Items file.
*PADS-LIBRARY-SCH-DECALS-V9*	Start of Schematic Decals file.
*PADS-LIBRARY-PCB-DECALS-V9*	Start of PCB Decals file.
*PADS-LIBRARY-PART-TYPES-V9*	Start of Part Types file.
*END*	End of file.

## Start of File

The start-of-file control statement identifies the data that follows it as library ASCII data of the specified type. The start-of-file control statement must be included at the beginning of every library ASCII data file.

The following list shows the start-of-file control statement required for each type of file:

File Type	Control Statement
Drafting Items	*PADS-LIBRARY-LINE-ITEMS-V9*
Schematic Decals	*PADS-LIBRARY-SCH-DECALS-V9*
PCB Decals	*PADS-LIBRARY-PCB-DECALS-V9*
Part Types	*PADS-LIBRARY-PART-TYPES-V9*

## End-of-File

The end-of-file statement is required at the end of a library ASCII file.

The control statement for the end-of-file command is:

\*END\*

## Font Information Definition

Many text items require font information to be specified. The font information parameter is represented by the variable *fontinfo*, which is a quoted string with the font style followed by the font face name. The font style contains from one to three keywords to specify a combination of bold, italic or underline styles. The style must contain one keyword with the value “Regular” or “Bold” followed by the optional keywords “Italic” and/or “Underline.”

Examples:

```
Regular Arial
Bold,Italic,Underline Times New Roman
```

If the text item uses the default system or stroke font, the font information will be defined as follows:

```
Default Font
```

## Drafting Item Definition

A drafting item can be a 2D Line or any of the following: 2D Line, Board Outline, Copper Shape, or Keepout.

### Format

Each drafting item consists of the following parts:

- Drafting item header line

- Drafting item timestamp
- Drafting item pieces where each piece consists of:
  - Piece header line
  - Piece corner coordinates
  - ...
- Text item (optional, if the drafting item has been combined with text)
- ...

## Header Format

The drafting item header lines consists of:

```
name linetype u x y pieces text  
TIMESTAMP year.month.day.hour.minute.second
```

Where:

Format	Description
<i>name</i>	User-defined drafting item name Values can be up to 40 alphanumeric characters, no spaces.
<i>linetype</i>	Type of item. The following types are allowed: LINES, BOARD, COPPER, KEEPOUT
<i>u</i>	Coordinate units type Can be either Imperial (mils) or Metric (mm), expressed as a single letter: I or M.
<i>x, y</i>	Coordinates of the origin of the item relative to the system origin.
<i>pieces</i>	Number of pieces that make up the line item. Values range from 1 to 16,777,216 (PADS Layout) or from 1 to 4,096 (PADS Logic).
<i>text</i>	Number of text lines associated with the line item. Values range from 0 to 32,767.
<i>year.month.day.</i>	Date of creation of the decal
<i>hour.minute.second</i>	GMT Time of creation of the decal



## Piece Entry Format

Each piece entry consists of a header line followed by a list of line segment or arc segment coordinates:

```

type numcoord width layer linestyle
x y (format for line segment)
x y ab aa ax1 ay1 ax2 ay2 (format for arcs)

```

Where:

Format	Description
<i>type</i>	Type of piece Valid values are OPEN, CLOSED, CIRCLE, COPOPEN, COPCLS, COPCIR, BRDCUT, BRDCCO, KPTCLS, KPTCIR, or TAG. (The TAG piece is used to combine coppers and copper cutouts inside the part decal into one item. It does not contain any coordinates and is used as either opening or close bracket. TAGs are also used to combine dimension pieces into a dimension drawing.)
<i>numcoord</i>	Number of coordinates defining the item For open items, this is the number of corners. For closed line items, it is the number of corners plus one (to return to the starting corner). Circles have two corners that define opposite ends of any diameter. For TAGs, 0 (zero).
<i>width</i>	Line width of all segments in the piece Values range from 0 to 0.25 inches, expressed in the selected units of the item. For TAGs, 0 (zero).
<i>layer</i>	Numeric layer number for use in PADS Layout. Values range from 0 to 250. A layer value of zero means all layers. The layer number is ignored in PADS Logic. For TAGs, the layer value specifies the TAG “type”: <ul style="list-style-type: none"> <li>• 1 means an “opening bracket”, that is, start of the group.</li> <li>• 0 means a “closing bracket,”, that is, end of the group.</li> </ul>

<i>linestyle</i>	<p>System flag for type of line or keepout restrictions A value of -1 indicates a solid line; a value of 0 indicates a dotted line. Keepout Restrictions (for piece types KPTCLS, KPTCIR only): Bit 0: (0x01) Placement Bit 1: (0x02) Trace and Copper Bit 2: (0x04) Copper Pour and Plane Area Bit 3: (0x08) Via and Jumper Bit 4: (0x10) Test Point Bit 5 : (0x20) Component Drill Bit 6: (0x40) Accordion Since TAGs have no graphics, the linestyle value for TAGs (typically -1) is non-significant.</p>
------------------	---

For piece line segments:

<b>Format</b>	<b>Description</b>
x, y	Coordinates of each successive corner of the line item relative to the first point in the line item. For closed polygons, the first corner will be repeated.

For piece arc segments:

*x y ab aa ax1 ay1 ax2 ay2*

Format	Description
<i>x, y</i>	Beginning of arc
<i>ab</i>	Beginning angle of the arc in tenths of a degree
<i>aa</i>	Angle swept by the arc from the start to the end (in tenths of a degree)
<i>ax1, ay1</i>	Lower left point of rectangle around circle of arc
<i>ax2, ay2</i>	Upper right point of rectangle around circle of arc The points of the rectangle define the circle radius describing the arc and the location of the center point of the circle relative to the origin of the line item.
$ax2 - ax1 = ay2 - ay1$	Diameter of the circle of the arc
$(ax1 + ax2)/2, (ay1 + ay2)/2$	Coordinates of the arc center

## Text Item Format

Each text entry consists of two lines as follows:

*x y rotation layer height width mirror just drwnum field fontinfo*

*textstring*

Format	Description
<i>x, y</i>	Coordinates of the text string location relative to the origin of the schematic
<i>rotation</i>	Orientation of the text in degrees
<i>layer</i>	Numeric layer number for use in PADS Layout. Values range from 0 to 250. A layer value of zero means all layers. The layer number is ignored in PADS Logic.
<i>height</i>	Height of text Values range from 0.01 to 1.0 inches, expressed in the selected units type.
<i>width</i>	Width of text in mils Values range from 0.001 to 0.050 inches, expressed in the selected units type.
<i>mirror</i>	Flag indicating text mirroring in PADS Layout. 0 = not mirrored, 1 = mirrored about the y-axis when viewed with zero orientation.

<i>just</i>	<p>Text string justification</p> <p>Value is the decimal equivalent of a bit string as follows:</p> <p>Bits 0 to 3 encode a four-bit value for horizontal justification with the following values: 0 = Left justified 1 = Center justified 2 = Right justified</p> <p>Bits 4 to 7 encode a four-bit value for vertical justification with the following values: 0 = Bottom justified 1 = Middle justified 2 = Top justified.</p> <p>Allowed values for justification are as follows: Bottom left = 0 Bottom center = 1 Bottom right = 2 Middle left = 16 Middle center = 17 Middle right = 18 Top left = 32 Top center = 33 Top right = 34</p>
<i>drwnum</i>	For auto-dimensioning text, this is the PCB drawing number. For other text, the value is zero.
<i>field</i>	A flag to indicate that the text item is a PADS Logic field label.
<i>fontinfo</i>	Font information string, as described in the Font Information Definition section.
<i>textstring</i>	Text string Up to 255 characters, spaces allowed.

## Schematic Decal Definition

Schematic decal coordinates are always expressed in mils; there is no metric option.

### Format

A schematic decal consists of the following parts:

- Schematic decal header lines
- Attribute label locations

- Piece definitions
- Text definitions
- Terminal definitions

## Header Format

The schematic decal header consists of four lines.

First line format:

```
name x y pnhgt pnwid pnmhgt pnmwid labels pieces txt terminals vis
```

Second line format:

```
TIMESTAMP year.month.day.hour.minute.second
```

Third line format:

```
fontinfo
```

Fourth line format:

```
fontinfo
```

Where:

Format	Description
<i>name</i>	User-defined decal name Values can be up to 40 alphanumeric characters.
<i>x, y</i>	Coordinates of the symbol origin Expressed in mils.
<i>pnhgt</i>	Height of pin number text Values range from 10 to 1000.
<i>pnwid</i>	Line width of pin number text Values range from 1 to 50.
<i>pnmhgt</i>	Height of pin name text Values range from 10 to 1000.
<i>pnmwid</i>	Line width of pin name text Values range from 1 to 50.
<i>labels</i>	Number of attribute label locations defined for the decal
<i>pieces</i>	Total number of drawing pieces that make up the symbol Values range from 0 to 4096. A definition follows each piece.

<i>txt</i>	Number of free text strings within the decal
<i>terminals</i>	Total number of terminals in the symbol that make up each decal Values range from 0 to 2048.
<i>vis</i>	Visibility flag Variable value associated with the visibility of part text. The minimum value is 0; the maximum value is 31. These values are determined in bits, and are as follows: For off-page symbols: BIT 0 = NETNAME INVISIBILITY For connector decals: BIT 0 = REF DES AND PIN NUMBER INVISIBILITY BIT 1 = PART TYPE INVISIBILITY For part decals: BIT 0 = REF DES INVISIBILITY BIT 1 = PART TYPE INVISIBILITY BIT 3 = PIN NAMES INVISIBILITY BIT 4 = PIN NUMBERS AND NAMES <b>Note:</b> A bit set indicates that the name is <i>not</i> visible.
fontinfo	Font information for pin numbers (2 <sup>nd</sup> line)
fontinfo	Font information for pin names (3 <sup>rd</sup> line)

## Attribute Labels Format

No matter what type of decal is being defined, there are at least two label definitions:

- Label for the reference designator location
- Label for the part type name location.

The use of the reference designator part type label varies, depending upon the type of decal. For example, an off page reference decal does not have a reference designator. Therefore, some decals might have unused label definitions, but at least two labels must be defined.

Refer to the previous section, Visibility Flag (*vis*), where bits 0 and 1 describe which items are displayed in the reference designator and part type labels for each type of decal.

If there are more than two labels, the additional labels are for part or connector attribute values.

```
x y rotation justification height width fontinfo  
textstring
```

Where:

Format	Description
<i>x, y</i>	Coordinates of the text string location relative to the origin of the schematic
<i>rotation</i>	Orientation of the text in degrees (listed as 0 for 0 degree rotation and 900 for 90 degree rotation)
<i>justification</i>	<p>Justification of the attribute text string</p> <p>The value is a bit string as follows:            Bit 0 = 0 Left justified or center (X direction) justified            Bit 0 = 1 Right justified            Bit 1 = 0 Bottom justified or middle (Y direction) justified            Bit 1 = 1 Top justified            Bit 2 = 0 Left or right justified            Bit 2 = 1 Center justified            Bit 3 = 0 Bottom or top justified            Bit 3 = 1 Middle justified.</p> <p>When attribute text is rotated the definitions for bits 0 and 1 are interchanged.            Allowed values for unrotated attribute text are as follows:            bottom left = 0            bottom right = 1            bottom center = 4            top left = 2            top right = 3            top center = 6            middle left = 8            middle right = 9            middle center = 12</p> <p>Allowed values for rotated attribute text are as follows:            bottom left = 0            bottom right = 2            bottom center = 4            top left = 1            top right = 3            top center = 5            middle left = 8            middle right = 10            middle center = 12</p>
<i>height</i>	<p>Height of text</p> <p>Values range from 10 to 1000 mils.</p>
<i>width</i>	<p>Width of text in mils</p> <p>Values range from 1 to 50 mils.</p>

<i>fontinfo</i>	Font information for attribute label text
<i>textstring</i>	Name of the attribute whose location is being defined The first two labels always have attribute names REF-DES and PARTTYPE. Subsequent labels may have a specific name such as “PART DESCRIPTION” or may have an asterisk (*) indicating that this location can be used for any attribute. Attribute names can be up to 255 alphanumeric characters long.

## Entry Format

The schematic decal piece format is identical to the "Drafting Item Format" with the following differences:

- All coordinate values are expressed in mils
- The piece type field *type* can only have the values OPEN, CLOSED, CIRCLE, and COPCLS.

## Terminal Format

Each terminal is described in two lines:

```
Tx y rtn xym pnx pny prtn pnjust pnmx pnmy pnmrtn pnmjust pindecals  
Pplx ply plrtn pljust nlx nly nlrtn nljust pflags
```

Where:

A terminal definition line starts with the letter “T” and the second line starts with the letter “P”.

<b>Format</b>	<b>Description</b>
<i>x, y</i>	Coordinates of the terminal location relative to the decal origin
<i>rtn</i>	Terminal rotation in degrees Value is 0 or 90.
<i>xym</i>	Terminal mirror flags Values are: 0 = no mirror 1 = X mirror 2 = Y mirror 3 = X and Y mirror
<i>pnx, pny</i>	X Y location of the pin number relative to the terminal
<i>prtn</i>	Pin number rotation in degrees Valid value is 0 or 90.



<i>pnjust</i>	Pin number justification See <i>justification</i> definition for Free Text items.
<i>pnmx, pnmy</i>	X Y location of the pin name relative to the terminal
<i>pnmrtn</i>	Pin name rotation in degrees Valid value is 0 or 90.
<i>pnmjust</i>	Pin name justification See <i>justification</i> definition for Free Text items.
<i>pindecal</i>	Name of the pin decal
<i>plx, ply</i>	X Y location of the pin properties label relative to the terminal
<i>plrtn</i>	Pin properties label rotation in degrees Valid value is 0 or 90.
<i>pljust</i>	Pin properties label justification See JUSTIFICATION definition for Free Text items.
<i>nlx, nly</i>	X Y location of the netname label relative to the terminal
<i>nlrtn</i>	Netname label rotation in degrees Valid value is 0 or 90.
<i>nljust</i>	Netname label justification See <i>justification</i> definition for Free Text items.
<i>pflags</i>	Defines whether the pin properties or netname label positions are valid for this terminal. If not valid, the positions are taken from the corresponding label positions in the pin decal associated with the terminal. A clear flag indicates the label is valid, a set flag indicates the label position in the terminal is to be ignored. The flags are: Bit 6Pin properties label position invalid Bit 7Netname label position invalid

## PCB Decal Definition

### Format

A PCB decal consists of the following parts:

- Header line
- Decal attributes
- Attribute label locations
- Piece definitions
- Text definitions

- Terminal definitions
- Pad-stack definitions
- Maximum layers designation

## Header Format

The PCB decal header lines consists of:

```
name u x y attrs labels pieces txt terminals stacks maxlayers  
TIMESTAMP year.month.day.hour.minute.second
```

Where:

Format	Description
<i>name</i>	User-defined decal name Values can be up to 40 alphanumeric characters.
<i>u</i>	Coordinate units type Can be either Imperial (mils) or Metric (mm), expressed as a single letter: I or M.
<i>x, y</i>	Coordinates of the symbol origin Expressed in mils.
<i>attrs</i>	Number of attributes defined for the decal.
<i>labels</i>	Number of attribute label locations defined for the decal.
<i>pieces</i>	Total number of drawing pieces that make up the symbol Values range from 0 to 16,777,216. A definition follows each piece.
<i>txt</i>	Number of free text strings within the decal.
<i>terminals</i>	Total number of terminals in the symbol that make up each decal Values range from 0 to 32,767.
<i>stacks</i>	Number of different pad stack definitions available to share between the terminals.
<i>maxlayers</i>	Parameter indicating a maximum (extended) layer mode 0 = standard mode, 1 = maxlayers mode

## Attribute Format

The attributes format is a list of name-value pairs in the following format:

```
"attrname" attrval
```

Where:

Format	Description
<i>attrname</i>	Attribute name Text string from 1 to 255 characters (uppercase or lowercase) enclosed in quotation marks because it may contain embedded spaces.
<i>attrval</i>	Attribute value Text string from 0 to 2,047 characters terminated by the end of the line.

### Attribute Labels Format

Each attribute label consists of two lines as follows:

*x y rotation mirror height width layer just flags fontinfo textstring*

Where:

Format	Description
<i>x, y</i>	Coordinates of the text string location relative to the origin of the schematic
<i>rotation</i>	Orientation of the text in degrees
<i>mirror</i>	Flag indicating text mirroring in PADS Layout. 0 = not mirrored, 1 = mirrored about the y-axis when viewed with zero orientation.
<i>height</i>	Height of text Values range from 0.01 to 1.0 inches, expressed in the selected units type.
<i>width</i>	Width of text in mils Values range from 0.001 to 0.050 inches, expressed in the selected units type.
<i>layer</i>	Numeric layer number for use in PADS Layout. Values range from 0 to 250. A layer value of zero means all layers.

<i>just</i>	<p>Justification of the attribute text string  Value is the decimal equivalent of a bit string as follows:  Bits 0 to 3 encode a four-bit value for horizontal justification with the following values:  0 = Left justified  1 = Center justified  2 = Right justified  Bits 4 to 7 encode a four-bit value for vertical justification with the following values:  0 = Bottom justified  1 = Middle justified  2 = Top justified.  Allowed values for 0 and 90 degree rotation are as follows:  Bottom left = 0  Bottom center = 1  Bottom right = 2  Middle left = 16  Middle center = 17  Middle right = 18  Top left = 32  Top center = 33  Top right = 34</p>
<i>flags</i>	<p>Type of label, name/value visibility, and right reading status  Values are the decimal equivalent of an eight-bit binary value with bit fields defined as follows:  Bits 0 to 2 contain a numeric value to define the label type:  0 = General attribute label  1 = Reference designator  2 = Part type  Bit 3 set indicates the label is right reading and displayed at the nearest 90-degree orientation.  Bit 4 set indicates label is right reading but display is not constrained to a 90-degree orientation.  Bit 5 set indicates that the attribute value is displayed.  Bit 6 set indicates that the short version of the attribute name is displayed.  Bit 7 set indicates that the full structured attribute name is displayed.</p>
<i>fontinfo</i>	Font information for the attribute label text.
<i>textstring</i>	<p>Name of the attribute whose location is being defined  The reserved names “REF-DES” and “PARTTYPE” refer to reference designator and part type labels  Up to 255 characters, spaces allowed.</p>

## Piece Definition Format

The PCB decal piece format is identical to the "Drafting Item Format" in this document, with the following differences:

*piecetype* cannot have the values BRDCUT or BRDCCO.

*piecetype* can have additional values COPCUT, COPCCO.

## Terminal Format

**T***x1 y1 x2 y2 pin*

A terminal definition line starts with the letter "T".

Where:

Format	Description
x1, y1	Location of the terminal relative to the decal origin
x2, y2	Location of the terminal pin number label relative to the decal origin.
pin	Pin number

## Pad Stack Format

Each pad stack definition consists of a header line followed by a line for each pad stack layer.

Header line:

**PAD** *pin numlayers plated drill [drlori drllen drloff]*

Each layer line can have one of the following formats:

*layer width shape*  
(Round and square normal or anti-pads)

*layer width shape intd*  
(Annular pads)

*layer width shape ori length offset*  
(Oval and rectangular pads)

*layer width shape ori intd spkwid numspk*  
(Thermal pads)

Format	Description
PAD	Keyword

<i>pin</i>	Pin number to which the pad stack applies If the pin number is zero, then the pad stack applies to all pins that do not have a specific pad stack.
<i>numlayers</i>	Number of pad stack layer lines that follow the header line.
<i>plated</i>	Either the keyword P for plated drill hole or N for nonplated drill hole.
<i>drill</i>	Drill diameter for the pad Value of zero indicates that there is no drill hole.
<i>drlori</i>	Orientation of a slotted hole Valid values range from 0 to 179.999 degrees.
<i>drllen</i>	Slotted hole length
<i>drloff</i>	Slot offset
<i>layer</i>	Layer number Valid values range from 1 to 250. or Layer code of the pin  Layer codes are defined as follows: -2 is the top layer -1 is all inner layers -0 is the bottom layer
<i>width</i>	Width of a finger pad or the external diameter of all other pad shapes
<i>shape</i>	Shape can be one of the following values: R—round pad S—square pad RA—round anti-pad SA—square anti-pad A—annular pad OF—oval finger pad RF—rectangular finger pad RT—round thermal pad ST—square thermal pad
<i>corner</i>	This field stores the numerical “corner radius” value and is used to support pads with rounded and chamfered corners. It only exists for square (S) pads and rectangular finger (RF) pad shapes. Zero value is used for 90 degree (non-rounded) pad corners; a positive value is used for pads with rounded corners; a negative value is used for pads with chamfered corners.
<i>intd</i>	Internal diameter of an annular or thermal pad
<i>ori</i>	Orientation of a finger pad or the thermal spokes Valid values range from 0 to 179.999 degrees.
<i>length</i>	Finger pad length

<i>offset</i>	Finger pad offset
<i>spkwid</i>	Thermal pad spoke width
<i>numspk</i>	Number of thermal pad spokes

## Part Type Definition

### Format

Each part type entry consists of the following parts:

- Part type header lines
- Attribute information (optional)
- Gate information (optional)
- Signal pin information (optional)
- Alphanumeric pins (optional)

## Header Format

The part type header lines consist of:

```
name pcbdecals u logfam attrs gates sigpins pinmap flag  
TIMESTAMP year.month.day.hour.minute.second
```

Where:

Format	Description
<i>name</i>	Part type name Values can be up to 40 alphanumeric characters.
<i>pcbdecals</i>	List of alternate PCB decal names, separated by colons <i>name:name:...</i> A PCB decal name can be up to 40 alphanumeric characters. The list may have a maximum of 16 alternates.
<i>u</i>	Coordinate units type Can be either Imperial (mils) or Metric (mm), expressed as a single letter: I or M.
<i>logfam</i>	Logic Family type Values can be any three alphanumeric characters.
<i>attrs</i>	Number of part attributes defined
<i>gates</i>	Number of gates in the part Values range from 0 to 702.
<i>sigpins</i>	Number of standard signals predefined in the part, which is typically, but not exclusively, power and ground. Values range from 0 to 1024.
<i>pinmap</i>	Number of alphanumeric pins defined in the part pin mapping. Values range from 0 to 32767.
<i>flag</i>	Decimal value of an eight-bit binary bit string: Bits 0–1 taken as a two-bit number define the type of part: 0 = normal part 1 = connector 2 = off-page reference. Bit 2 is a flag that is set for a non-ECO registered part type. Bit 5 is a flag that is set for a flip chip part ( used in advanced packaging toolkit) Bit 6 is a flag that is set for a die part ( used in advanced packaging toolkit) Bit 7 is a flag that is set to indicate an incomplete or inconsistent part type.



## Attribute Format

The attributes format is a list of name-value pairs in the following format:

```
"attrname" attrval
```

Where:

Format	Description
<i>attrname</i>	Attribute name Text string from 1 to 255 characters (uppercase or lowercase) enclosed in quotation marks because it may contain embedded spaces.
<i>attrval</i>	Attribute value Text string from 0 to 2,047 characters terminated by the end of the line.

## Gate Format

The gate format consists of three parts:

- Header line, which describes the gate type and number of pins in the gate.
- List of alternate gate decals
- List of the actual pins within the gate.

The format for gates of normal parts:

```
GATE decals pins gateswap
decalname
pinnumber pinswap pintype pinname
```

For connector part types:

```
CONN decals pins
decalname pintype
pinnumber pinswap
```

For Off-page symbol part type:

```
OFF decals
decalname pintype
```

For Ground symbol part type:

```
GND decals
decalname pintype netname
```

For Power symbol part type:

```
PWR decals
    decalname pintype netname
```

Where:

<b>Format</b>	<b>Description</b>
<i>decals</i>	Number of alternate gate, connector, off-page, ground or power decal names defined.
<i>pins</i>	Number of pins in the gate Valid values range from 0 to 32767.
<i>gateswap</i>	Gate swap type It is assumed that gates with the same swap type are electrically equivalent. A gate with a swap type of 0 is not swappable.
<i>decalname</i>	Gate, connector, off-page, ground or power decal name A decal name may have up to 40 alphanumeric characters. Gates can have a maximum of four alternates. Connector, off-page, ground or power parts may have a maximum of 127 alternates.
<i>pintype</i>	For Connectors, off-page, ground or power decals this specifies the pin type for the symbol with the same values as described for gate pins below.
<i>netname</i>	For Power and Ground decals only, this specifies the default net name that is associated with the symbol.
<i>pinnumber</i>	Electrical pin number of the pin in the gate or connector. Alphanumeric pin number up to 7 characters in length.
<i>pinswap</i>	Swap type of the pin It is assumed that pins with the same swap type are electrically equivalent. A pin with a swap type of 0 is not swappable.
<i>pintype</i>	Pin electrical type. Values are: S—source pin B—bidirectional pin C—open collector pin O—or-tieable source pin T—tristate pin L—load pin Z—terminator pin P—power pin G—ground pin U—undefined pin

<i>pinname</i>	Optional Electrical pin name of the pin in the gate Pin names may not be duplicated. A pin name can be up to 40 alphanumeric characters. <i>No</i> spaces are allowed in a pin name.
----------------	--

## Signal Pin Format

This section describes pins for standard signals for parts. Typically, standard signals are power or ground, but any signal name may be used. For each entry, the format is as follows:

**SIGPIN** *pinnumber netname*

Where:

Format	Description
SIGPIN	Keyword
pinnumber	Pin number of the signal pin Valid values are alphanumeric pin numbers up to 7 characters in length.
netname	Net name of the standard signal Net names may be up to 47 alphanumeric characters.

## Pin Mapping Format

This section is used only for part types with alphanumeric pins that have PCB decals assigned with only strictly numeric pin numbers. The Pin Mapping is a list of alphanumeric pin numbers assigned to the PCB decal pins in decal pin number order, i.e. the first alphanumeric corresponds to decal pin 1, the 2<sup>nd</sup> to pin 2 etc. If a pin mapping is defined, an alphanumeric pin must be defined for each decal pin.

The format is:

*pin\_1 pin\_2 pin\_3 ... pin\_n*

Where:

Format	Description
pin_n	Alphanumeric pin number corresponding to decal pin n.



# End-User License Agreement

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