

# Differences Between rev A and rev B of IPC-2581

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# Specifications

- The Spec element, a child of the CadHeader element, was reworked
- The following specification types, and their associated enumerated lists were added:
  - Backdrill, Compliance, Conductor, Dielectric, General, Impedance, Technology, Temperature, Tool, V\_Cut
- Optional SpecRef elements, with IDs referencing the relevant Spec, were added to the following elements:
  - Layer, Stackup, StackupLayer, StackupGroup, Hole, Set

# Attribute substitution group

- The Attribute substitution group was removed
  - Most of its child elements, e.g. BooleanAttribute, DoubleAttribute, were also removed
- Retained only NonStandardAttribute
  - For Component, LogicalNet, Set & Step elements

# layerFunctionType

- Added the following to the enumerated list for layerFunctionType
  - BOARDFAB
  - STACKUP\_COMPOSITE
  - V\_CUT

# StandardPrimitive

- Added the following optional child elements to each StandardPrimitive (Butterfly, Circle, Contour, etc) definition
  - Xform
    - Existing element, providing Rotation & Mirror
  - FillDesc
    - New element to describe fill type, e.g. FILL, HOLLOW, HATCH
  - LineDesc
    - Existing element with new line property type, e.g. SOLID, DOTTED, DASHED
- Corresponding DictionaryFillDesc and DictionaryLineDesc elements were added

# Function Mode

- Changed function mode FULL to USERDEF
  - To allow for full customization of file section content
  - To be revoked in rev B amendment 1, due to section interdependancies

# PadStackDef

- New element, with child elements  
PadstackHoleDef and PadstackPadDef, to describe padstacks

```
<Step name = "C027D17P">  
<PadStackDef name = " C027D17P ">  
<PadstackHoleDef name="PSHD_1" Diameter= ".027" platingStatus="PLATED" plusTol="0.002" minusTol="0.002" X="0.0" Y="0.0"/>  
<PadstackPadDef layerRef="TOP" PadUse="REGULAR" >  
<Location X = "0.0" Y="0.0"/>  
<StandardPrimitive id = "CIRCLE_10"/>  
</PadstackPadDef>  
<PadstackPadDef layerRef="IL-1" PadUse="REGULAR" >  
<Location X = "0.0" Y="0.0"/>  
<StandardPrimitive id = "CIRCLE_10"/>  
</PadstackPadDef>  
<PadstackPadDef layerRef="IL-1" PadUse="ANTIPAD" >  
<Location X = "0.0" Y="0.0"/>  
<StandardPrimitive id = "PAD15"/>  
</PadstackPadDef>  
<PadstackPadDef layerRef="IL-1" PadUse="THERMAL" >  
<Location X = "0.0" Y="0.0"/>  
<StandardPrimitive id = "FIGURE_THERMAL_25_+"/>  
</PadstackPadDef>
```

# padstackDefRef

- Added reference to padstack definitions (names originating from CAD source) in the landpattern and artwork pad definitions, e.g.

```
<LandPattern>
```

```
  <Pad padstackDefRef="LS240X50_BGA_CORN">
```

```
    <PinRef pin="A2"/>
```

```
    <Xform xOffset="-0.6364" yOffset="-0.6364" rotation="45.00"/>
```

```
    <Location x="0" y="0"/>
```

```
    <StandardPrimitiveRef id="NS0:Oblong_456"/>
```

```
  </Pad>
```



# Package

- Added element PickupPoint to the Package element
  - Defines an X, Y location for assembly pickup
- Added attribute pinOneOrientation to the Package element
  - Defines the location of pinOne relative to the centroid of the package
  - The intent is to describe the default orientation of the package (e.g. 'landscape' or 'portrait' for an IC), which could establish a relationship to a library definition standard such as IEC or IPC, or provide a zero degree rotation reference for assembly.

# qualifiedNameType

- The character “#” has been added to the allowed characters in qualifiedNameType
  - To allow for part numbers containing a “#”

# RefDes

- RefDes has become part of a substitution group BomDes, which also includes MatDes for materials and DocDes for documents.
  - This does not effect existing RefDes definitions
- The attribute packageRef moved from the element BomItem to its child element RefDes.
  - To allow for alternative packages of the same part in the same design

# numberIO

- The attribute numberIO of element BomItem changed to pinCount
  - To better describe the purpose of the attribute

# Stackup

- The max number of stackups per file changed from 1 to unbounded
- Attributes refDes and comment were added to Stackup
- The StackupImpedance element, a child of the Stackup element, was removed
  - Replaced by a SpecRef relation to an Impedance Spec
- A new element CADDataLayerRef was added to the StackupGroup element
  - To reference a group of layers to a single layer from the CAD source, e.g. single dielectric layer in CAD maps to a composite stack of dielectrics in fabrication

# StackupLayer

- The element Attribute, plus attributes weight, materialType, and coating were removed from the StackupLayer element
  - Replaced by a SpecRef relation to an Impedance Spec
- Attributes toPlus & toMinus were added
  - For tolerancing

# VplComponent

- The element VplComponent, and all its attributes and child elements, were removed
  - This does not affect existing exported files because it was never used

# SurfaceFinish

- The SurfaceFinish element, a child of the CadHeader element, was removed
- The intention is that:
  - a surface finish should be represented by a layer, with layerFunction COATINGCOND or COATINGNONCOND, with its material properties defined by a SpecRef.
  - There can be multiple surface finishes within a stackup, e.g. on laminates, different finishes on top and bottom.



# DrillTool

- The DrillTool element, a child of the Layer element, was removed.
- It is replaced by a SpecRef relation to a Tool Spec

# Pad

- A child substitution group of the Pad element, StandardShape, was replaced by a superset substitution group, Feature, to include custom shapes.

# Pin & PinRef

- The Location child element of Pin was made optional
- ComponentRef child element of PinRef was made optional

# Set

- The child element Slot of the Set element was renamed to SlotCavity
  - A new attribute Z\_AxisDim was added to the SlotCavity element
- The toolIdRef attribute of the Set element was removed
  - Replaced by a SpecRef relation to a Tool Spec
- The attribute componentRef was added to the Set element
  - To relate a pad shape in the artwork to its component

# No Implied Mirror

- There is no implied mirroring for any components or objects on the bottom side of the board
  - The default value for the mirror attribute in the Xform element is `FALSE`. It must be explicitly set for components or objects on the bottom side.