**EMD**

**(Electronic Module Description Specification)**

**Version 1.0 Draft 0**

Ratified TBD

# Electrical Module Description

**INTRODUCTION**:

A “module level component” is the generic term to be used to describe an electronic module which can contain components, modules, and which can connect to another module through a set of user visible pins. The electrical connectivity of such a module level component is referred to as an “Electrical Module Description”. An electrical module description file (an .emd file) is defined to describe the connections of a module level component between the module pins and its module pins, components and other modules. A module can be a package with a single component, a package with multiple components, a board with zero, one, or multiple components, a board with zero, one, or multiple components, an interposer, a connector, and a cable.

A fundamental assumption regarding the electrical module description is that the interconnect between the module pins, components, and modules can be represented by IBIS-ISS subckts and Touchstone files directly. Also, this current description does allow one to describe electrical coupling between connections.

A component is represented by a .ibs file which may represent either a die and package, or a bare die.

A connection is represented by a list of its module pins, component pins and module pins that have a small insertion loss at Nyquist between all of the pins.

What is, and is not, included in an Electrical Module Description is defined by its boundaries. For the definition of the boundaries, see the Description section under the Interconnect Branch.

Usage Rules:

A .emd file is intended to be a stand-alone file, not referenced by or included in any .ibs or .pkg file. Electrical Module Descriptions are stored in a file whose name looks like <filename>.emd, where <filename> must conform to the naming rules given in Section 3 of this specification. The .emd extension is mandatory.

The Parameter Tree shall contain a Root, Branches and Leaves. The Root, and Branch Leaf names shall be token strings that may contain the characters “ “, “(“, or “)”. They may not contain the tab or “ character. If the token string contains “ “, “(“, or “)”, the token must be surrounded by the “. A Leaf may contain one or more values. Values shall be token strings. The rules for values token strings shall be the same as the rules for Root, Branch and Leaf token strings.

Contents:

A .emd file is structured using a Parameter Tree Structure. It must contain a descriptive Root, and the following Brancheslisted below:

General\_Information

Module\_Pins

Modules\_and\_Components

Connections

Interconnect

The General\_Information Branch must contain the following Leaves:

EMD\_Version

File\_Name

File\_Rev

The General\_Information Branch may also contain the following optional Leaves:

Manufacturer

Date

Source

Notes

Disclaimer

Copyright

The actual module description is contained in the following Branches:

Module\_Pin\_List

Modules\_and\_Components

Connections

Interconnect

**ROOT DEFINITION**

*Brance:* <Root Name>

*Required:* Yes

*Description:* Marks the beginning of an Electrical Module Description.

*Usage Rules:* The root the name of the module level component.

*Example:*

(“16Meg X 8 SIMM Module”

**BRANCH DEFINITIONS:**

*Brance:* General\_Information

*Required:* Yes

*Description:* Branch contains Leaves containing requires and optional Leaves

*Usage Rules:* This Branch contains the required leaves EMD\_Version, File\_Name, File\_Rev and may contain the optional Leaves Manufacturer, Date, Source, Notes, Disclaimer, Copyright

*Example:*

(16Meg\_X\_8\_SIMM\_Module

(General\_Description

**GENERAL INFORMATION LEAF DEFINITIONS:**

*Leaf:* **EMD\_Version**

*Required:* Yes

*Description:* Declares the version .emd file.

*Usage Rules:* Following the leaf is the emd version.

*Example:*

(16Meg\_X\_8\_SIMM\_Module

(General\_Description

(EMD\_Version 1.0)

*Leaf:* **File\_Name**

*…*

*Leaf:* **File\_Rev**

…

*Leaf:* Manufacturer

*Required:* No

*Description:* Declares the manufacturer of the components(s) that use this .emd file.

*Usage Rules:* Following the leaf is the manufacturer’s name. It must not exceed 40 characters, and can include blank characters. Each manufacturer must use a consistent name in all .emd files.

*Example:*

(“16Meg X 8 SIMM Module”

(General\_Description

(Manufacturer “Quality SIMM Corp.”)

*Leaf:* **Date**

*Leaf:* **Source**

*Leaf:* **Notes**

*Leaf:* **Disclaimer**

*Leaf:* **Copyright**

*Brance:* Module\_Pin\_List

*Required:* Yes

*Description:* Branch contains Leaves containing module visible pins.

*Usage Rules:* This Branch contains leaves for each module visible pin. Each visible pin leaf shall consist of a pin\_name and a connection\_name.

*Example:*

(16Meg\_X\_8\_SIMM\_Module

(Module\_Pin\_List

(A1 DQ1)

(A2 DQ2)

(A3 DQ3)

)

*Brance:* Modules\_and\_Components

*Required:* Yes

*Description:* Branch contains Leaves containing modules and components in the module.

*Usage Rules:* This Branch contains leaves for each module and component in the module. Each module and component leaf shall consist of a reference designator. If the leaf is a component its values are an IBIS file name and component. If the leaf is a module its value is the EMD file name.

*Example:*

(16Meg\_X\_8\_SIMM\_Module

(Modules\_and\_Components

(u23 pp100.ibs Processor)

(u24 simm.emd )

(u25 ls244.ibs “NoName 74LS244a”)

(u26 r10K.ibs My\_10K\_Pullup)

)

*Brance:* Connections

*Required:* Yes

*Description:* Branch contains Leaves containing connections.

*Usage Rules:* This Branch contains leaves for each connection. Each connection shall consist of a connection\_name followed by the visible pins and component and modules pins that are connected.

*Example:*

(16Meg\_X\_8\_SIMM\_Module

(Connections

(DQ1 A1 U1.17 U2.17 U3.17)

(DQ2 A2 U1.18 U2.18 U3.18)

(DQ3 A3 U1.19 U2.19 U3.19)

)

*Brance:* Interconnect

*Required:* Yes

*Description:* Branch contains Branches containing Model Connection Protocals for IBIS-ISS subckts and Touchstone files.

*Usage Rules:* This Branch contains branches containing Model Connection Protocals (MCP) for IBIS-ISS subckts and Touchstone files.. Each MCP shall contain leaves defining the IBIS-ISS file and subckt name or Touchstone file and a Branch defining the ports of the IBIS-ISS subckt or Touchstone file.

*Example:*

(16Meg\_X\_8\_SIMM\_Module

(Interconnect

(DQ1

(IBIS-ISS xyz.iss dq1)

(Ports

(1 A1)

(2 U1.17)

(3 U2.17)

(4 U3.17)

)

)

(DQ2

(Tstonefile DQ2.s4p)

(Ports

(1 A2)

(2 U1.18)

(3 U2.18)

(4 U3.18)

)

)

(DQ1\_DQ2

(Tstonefile DQ1\_DQ2.s8p)

(Ports

(1 A1)

(2 U1.17)

(3 U2.17)

(4 U3.17)

(5 A2)

(6 U1.18)

(7 U2.18)

(8 U3.18)

)

)

)

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