

IBIS Power Integrity BIRDs PIM BIRD and Updated BIRD223.1

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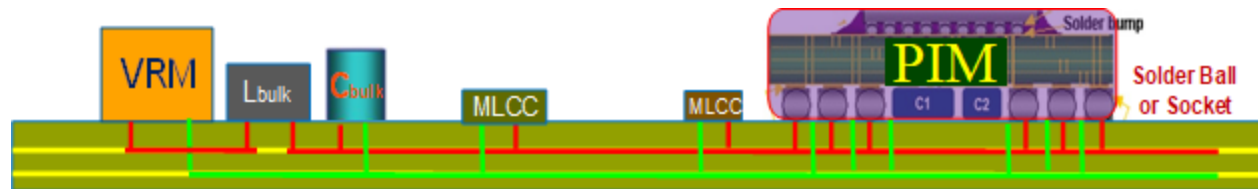
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Introduction

- The PIM BIRD was originally written as an alternative to BIRD 223.1
- An updated BIRD 223.1 was introduced last week. I will first introduce the high-level requirements of Power Integrity models for IBIS, EMD and other electronic Devices
- Some major differences between the PIM BIRD and the updated BIRD 223.1

IBIS Power Integrity BIRD Introduction

Power Integrity engineers use EDA tools to evaluate their PCB layout and power supply circuits. To accurately model the rail current distribution in the PCB, the EDA tools require **sufficiently** accurate package interconnect models and **sufficiently** accurate silicon DC and AC loading requirements. The PIM BIRD and the updated BIRD 223.1 define Power Integrity Models for electronic devices. An electronic Device is either an .ibs component, .emd model or other electronic components.



A PI Model consists of a silicon load model and a Device Power Delivery Network (Device PDN). A Device PDN is either an IBIS-ISS subcircuit or a Touchstone file.

The Device PDN is the interface between the silicon load model and the Board PDN/VRM.

The silicon load model has one or more stimuli and optionally one or more rules that can be applied at the stimulus/Device PDN interface, pin/Device PDN interface and/or Device PDN probes.

Additional Requirements

- These models enable EDA Tools to do DC, AC (Impedance) and TD (Time Domain) Analysis of a Device along with VRM Models and Board PDN Models supplied by the EDA tool. Rules supplied by the IC Vendor in the model determine if the Power Delivery to the Device satisfies the Device Power Delivery Requirements.

IBIS-ISS Subcircuits Used in Analysis Type AC or TD

PIM BIRD

Updated BIRD 223.1

IBIS-ISS subcircuits used in Analysis_type AC or TD reference terminal rules.

- Stimulus ports can use
 - Reference Node 0
 - **Common reference terminals**
 - Separate reference terminal for each stimulus.
- Pin ports can use
 - Reference Node 0
 - **Common reference terminals**
 - Separate reference terminal for each pin port
- Probe ports can use
 - Reference Node 0
 - **Common reference terminals**
 - Separate reference terminal for each probe port

IBIS-ISS subcircuits used in Analysis_type AC or TD must have subcircuit terminal pairs which are “plug-in compatible” with S-parameter ports, regardless of whether the subcircuit definition exposes all reference terminals (2N syntax), one reference terminal (N+1 syntax), or none (N syntax). Such subcircuits typically use dependent sources (such as polynomial or Laplace elements) with coefficients or expressions to establish the relationships between the terminal pairs instead of circuit elements (such as resistors, inductors, capacitors, etc.), and do not contain connections to the global simulator reference (node 0) through which currents can enter or exit the subcircuit, other than the reference terminals of the dependent sources exposed to the outside world through the subcircuit terminals when the N+1 or N syntax is used.

Next Steps

- We request that IBIS members and followers review these two BIRDs carefully and contribute by sending e-mails to me (wkatz@mathworks.com), the IBIS Reflector (ibis-eda ibis@freelists.org), or the IBIS-ATM Reflector (IBIS-ATM ibis-macro@freelists.org), or coming to and contributing to the IBIS-ATM committee meetings ([Click here to join the meeting](#)) held Tuesdays at 3 PM EST.