EMI Parameters for IBIS

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Introduction

- Reason for this presentation
 - Increasing interest in modeling EMI
 - The parameters that exist today
- Recap of BIRD 74
- What's next

Recap of BIRD 74

BIRD74_recap_a.pdf

- Will be uploaded to the IBIS web site along with this presentation

Contents

- History
- Why the BIRD was introduced
- **–** EMI Mechanisms
- The Parameters
- Using the Parameters
- Reference Documents

BIRD 74 Parameters

• Component

• Component Type

Indicates whether the component is a connector.

• Domain

Defines whether the component is Analog, Digital or both.

• Family

Describes the logic family. This can be one of UNDEF, TTL, CMOS or ECL.

• Cpd

Power Dissipation Capacitance. (Used to estimate DC power bus EMI)

• Die_height

Height of the die within the package

• Heatsink

Heatsink dimensions (used to calculate its capacitance)

BIRD 74 Parameters

• Pin

• CSPEC name

Describes a user definable name that corresponds to a model listed in the [Model] keyword. Used to define connector pin impedances. Only used when the component is a connector

• Model

• Ferrite

Indicates that the model for this pin is a ferrite.

• Cspec

Assigns parameters to the pin CSPEC name. Possibilities are: the pin is **Unshielded**, **Shielded** (ground pins provide the shield), **Shielded_pwr** (power pins provide the shield), or **Con_to_shield** (pin connected to connector shell). In addition the pin can have an explicit filter capacitance. This is used to calculate an antenna impedance for the pin.

(Some) References

[1] J.L. Drewniak, T.H. Hubing, and T.P. Van Doren, "Investigation of Fundamental Mechanisms of Common-Mode Radiation from Printed Circuit Boards with Attached Cables," *Proceedings of the 1994 IEEE International Symposium on Electromagnetic Compatibility*, Chicago, IL, August 1994, pp. 110-115.

[2] C.R. Paul, *Introduction to Electromagnetic Compatibility*, John Wiley Interscience, New York (1992).

[3] D.M. Hockanson, J.L. Drewniak, T.H. Hubing, T.P. Van Doren, F. Sha, C.-W. Lam, and L. Rubin, "Quantifying EMI Noise Sources Resulting from Finite-Impedance Reference Planes," *IEEE Transactions on Electromagnetic Compatibility*, vol. EMC-39, no. 4, November 1997, pp. 286-297.

[6] S. Radu, R.E. DuBroff, T.H. Hubing, and T.P. Van Doren, "Designing Power Bus Decoupling for CMOS Devices," *Proceedings of the 1998 IEEE International Symposium on Electromagnetic Compatibility*, Denver, CO, August 1998, pp. 375-380.

[7] J. Mao, B. Archambeault, J.L. Drewniak, and T.P. Van Doren, "Estimating DC Power Bus Noise," *IEEE EMC Symposium*, Minneapolis, MN, August 2002, pp. 1032-1036.

[10] Katja Koller, Gerald Bannert, "Crossbar Current out of CMOS IBIS Models", IBIS meeting at DATE 2002

What's next

Information gathering

- What new parameters are needed?
- Reference documentation
- Cookbook