

Compliant IBIS Package Models

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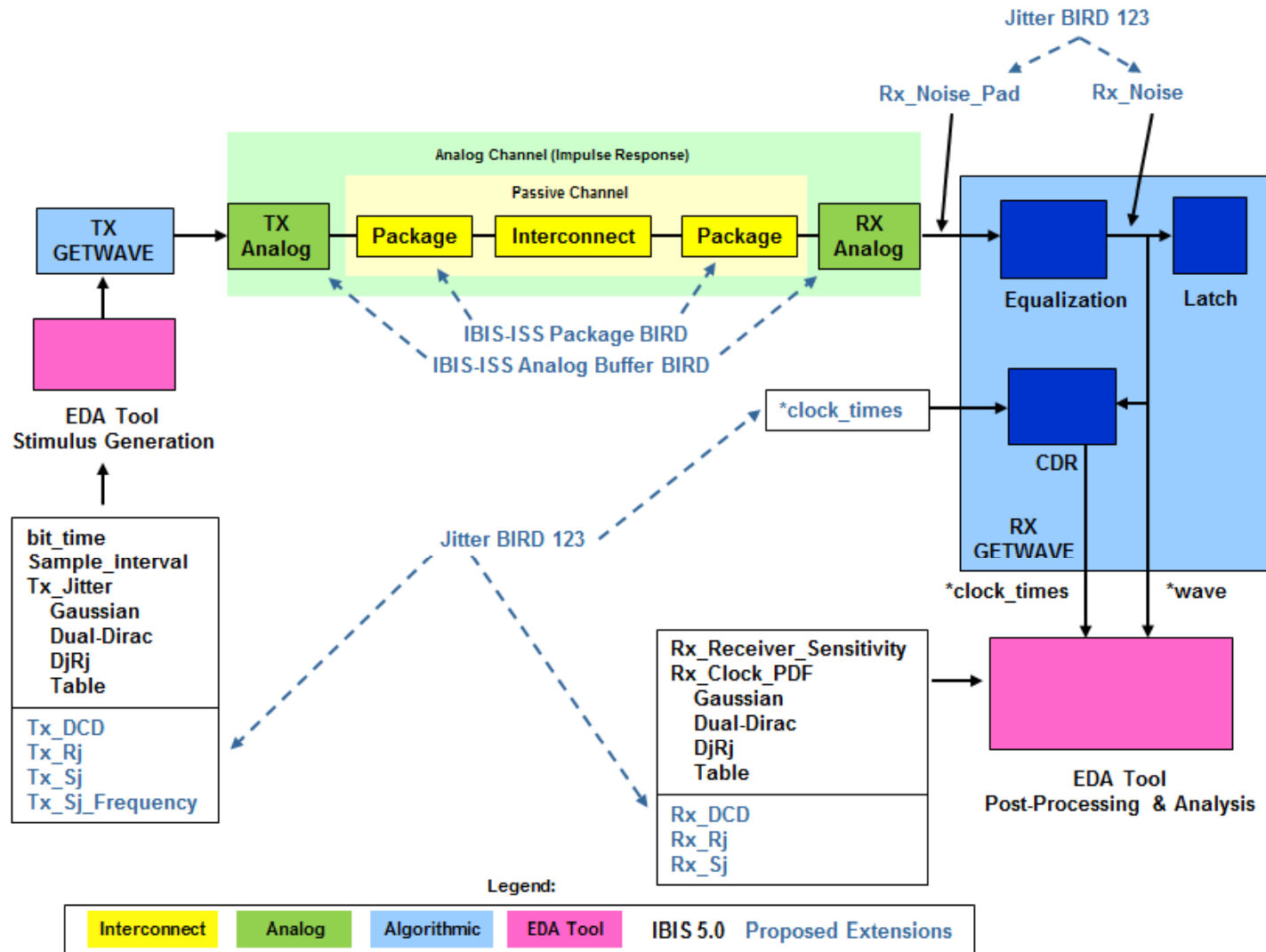
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Overview

- Components of an IBIS-AMI Simulation
- What the Industry Requires for Accuracy
- IBIS ISS Satisfies Industry Requirements
- .ibs file Illustrating ISS Package Interface
- New IBIS Section [ISS Packages]
- Examples
- Same Syntax for EBD Files
- Summary

Simulation IBIS-AMI Components



IBIS ISS Satisfies Industry Requirements

- Broadband Package Models
- Crosstalk Package Models
- Power Delivery Package Models

Example Illustrating ISS Package Interface

New IBIS Keyword ISS_Package

```
[Component] my_ibis_component
ISS_Package component_package
[Pin] signal_name    model_name  R_pin L_pin C_pin
1  rx1_p  rx      NA  NA  NA
2  rx1_n  rx      NA  NA  NA
3  tx1_p  tx      NA  NA  NA
4  tx1_n  tx      NA  NA  NA
5  VDDQ   POWER
6  VSSQ   GND
[Diff Pin] inv_pin  vdiff tdelay_typ tdelay_min tdelay_max
1 2
3 4
[Model]  tx
Model_type Output
ISS_Package tx_package Td=AMI(Length) Zo=AMI(Zo)
[Model]  rx
Model_type Input
ISS_Package rx_package Td=AMI(Length) Zo=AMI(Zo)
```

New IBIS Section [ISS Packages]

Contains interfaces to ISS Package subckts that can be assigned to specific pins or groups of pins.

Example of ISS Package subckt used by the differential pins 1 and 2.

```
[ISS Package] componenet_package
ISS_Package_File Package.iss
ISS_Package_Subckt Diff_Pins_1_2
ISS_Package_Arguments
Port 1 Pin.1
Port 2 Pin.2
Port 3 Pad.1
Port 4 Pad.2
Parameter Td 99ps
Parameter Zo 51
```

ISS Subckt:

```
.subckt Diff_Pins_1_2 pinH pinL padH padL Td=50ps Zo=50
T1 pinH 0 padH 0 Td=Td Zo=Zo
T2 pinL 0 padL 0 Td=Td Zo=Zo
.ends Diff_Pins_1_2
```

Example Including Crosstalk and Power

ISS_Package_File Package.iss

ISS_Package_Subckt Coupled_Power

Port 1 Pin.1

Port 2 Pin.2

Port 3 Pin.3

Port 4 Pin.4

Port 5 Pin.5

Port 6 Pin.6

Port 7 Pad.1

Port 8 Pad.2

Port 9 Pad.3

Port 10 Pad.4

Port 11 Pad.5

Port 12 Pad.6

[Models] Can Point to ISS Package Models

Example of ISS Differential Package Model used by [Model] Tx

[ISS Package] tx_package
ISS_Package_File Package.iss
ISS_Package_Subckt tx_package
ISS_Package_Arguments
Port 1 PinP
Port 2 PinN
Port 3 PadP
Port 4 PadN
Parameter Td AMI(Td)
Parameter Zo AMI(Zo)

[ISS Package] can be a Model Selector

Example of ISS Cross Talk Package Model used by [Model] Tx assuming the two aggressor differential channels, and a non coupled models

ISS_Package_File Package.iss

ISS_Package_Subckt tx_xtalk_package

ISS_Package_Arguments

Port 1 PinHP1

Port 2 PadHP1 | Port # 2 of the subckt is the Pad side of the active high aggressor 1 Pin

Port 3 PinHN1

Port 4 PadHN1

Port 5 PinHPV | Port # 5 of the subckt is the Pin side of the active high victim Pad

Port 6 PadHPV

Port 7 PinHNV

Port 8 PadHNV

Port 9 PinHP2

Port 10 PadHP2

Port 11 PinHN2

Port 12 PadHN2

ISS_Package_Subckt tx_package

ISS_Package_Arguments

Port 1 PinP

Port 2 PinN

Port 3 PadP

Port 4 PadN

Parameter Td AMI(Td)

Parameter Zo AMI(Zo)

Same Syntax for EBD Files

```
[IBIS Ver]    5.x
[File name]   simple.ebd
[Begin Board Description] Simple
[Number Of Pins] 2
[Pin List] signal_name
1           DQS0
2           DQS0#
[ISS Packages]
<see next slide>
[End ISS Packages]
[Reference Designator Map]
| Ref Des  File name    Component name
U1         simple.ibs  simple
U2         simple.ibs  simple|
U3         simple.ibs  simple|
U4         simple.ibs  simple|
[End Board Description]
[End]
```

[ISS Packages] Example in EBD File

[ISS Packages]

ISS_Package_File simple.iss

ISS_Package_Subckt Pins_1_2

ISS_Package_Arguments

Port 1 Pin.1

Port 2 Pin.2

Port 3 Pad.U1.8

Port 4 Pad.U1.9

Port 5 Pad.U2.8

Port 6 Pad.U2.9

Port 7 Pad.U3.8

Port 8 Pad.U3.9

Port 9 Pad.U4.8

Port 10 Pad.U4.9

[End ISS Packages]

Summary

- In order for IC Vendors to make accurate compliant IBIS models, IBIS must be extended to handle broadband package models.
- This presentation describes a proposed implementation currently in discussion within the IBIS-Interconnect committee.
- Advantages of this proposal
 - Simple syntax
 - Same syntax in both .ibs and .ebd files
 - Same syntax as being proposed for ISS Buffer Models
- Functionality supported in this proposal
 - Broadband
 - ISS
 - Coupling
 - Functionality
 - Scoping packages to [Model]s