IBIS-X Model Examples

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IBIS 3.2 Pinlist

[PIN]	signal_name	model_name	R_pin	L_pin	C_pin
1	Vcc	Power			
2	GND	GND			
3	Sig1	buffer1	0.1	6n	9p
4	Sig2	buffer2			

There is a fixed I/O Topology

Values can be overridden

Things can be omitted (Input/Output)

But nothing can be added

What is a Model?

- The IBIS 3.2 “Circuit” Model
  - Pre-defined topology
- “Component” Model
  - Pins and packages
- “Buffer” Model
  - Numbers, Vectors, and Data tables

What is a Model?

- The IBIS-X “Behavioral” Model
  - Model maker defines topology
- “Component” Model
  - Pins and packages
- “Buffer” Model
  - Numbers, Vectors, and Data tables

Defining a Simple Model

```
[Define Model] my_driver
| Using a pre-defined model based on IBIS 3.2
| This defines the power/gnd/pad/pin nodes
.inherit model_base
| Add a voltage-dependent cap between output pin and Vcc
capacitor c_top1 (pad vcc) C = [C_top] (V.pad)
| Add a temperature-dependent pullup resistor
resistor R_up (pad vcc)      R = [R_pull] (Temperature)
[End Define Model]
```

Model Data

[Model] buffer1 | a name to use in the pinlist
model_type my_driver | which model_type uses this data
| followed by all the data required for my_driver models
C_comp 3pF 2pF 4pF
[Supply Voltage] 3.3v 3.0v 3.6v
[C_top]
0 1p
3 3p
[R_pull]
0 10k
125 20k
[End Model]

Model Data

[Model] buffer2 | a name to use in the pinlist
model_type my_driver | which model to use
| a second buffer, same type, new data
C_comp 12p 6p 20p
[Supply Voltage] 3.3v 3.0v 3.6v
[C_top]
0 1.5p
3 4.0p
[R_pull]
0 8k
75 4k
[End Model]

IBIS-X “Behavioral” Models

- Behavioral model concepts
  - Add components that model effects (such as vsource)
  - Symbolic values (such as C_comp)
  - Tables and equations for components
  - Time, Temperature, etc.

IBIS-X Primitives

- Resistor
- Capacitor
- Inductor
- Voltage source
- Current source
- Voltage-controlled voltage source
- Voltage-controlled current source
- Transmission lines (including coupling)

IBIS-X Primitives

- Resistor Examples

resistor R1 (n1 GND) R = 10k

resistor r2 (12 13) R = (10k * (1+ (Temperature-273)*0.001))

resistor a1 (VCC v1) R = (123 * v.v1 / Vcc)

resistor a2 (na GND) I = TABLE [Series MOSFET](v.na)

resistor a3 (nc, nd) V = TABLE [Table_x](i.nd)

IBIS-X “Behavioral” Models

- Model Maker provides
  - Model behavior
  - Model data
  - Pinlist
- User provides
  - Pinlist (such as FPGA)
  - Model Selector