4 File Header Information

Keyword [IBIS Ver]

Required Yes

Description
Specifies the IBIS template version. This keyword informs electronic parsers of the kinds of data types that are present in the file.

Usage Rules
[IBIS Ver] must be the first keyword in any IBIS file. It is normally on the first line of the file, but can be preceded by comment lines that must begin with a "|".

```
[IBIS Ver]  5.0   | Used for template variations
```

Keyword [Comment Char]

Required No

Description
Defines a new comment character to replace the default "|" (pipe) character, if desired.

Usage Rules
The new comment character to be defined must be followed by the underscore character and the letters "char".
For example:
"|_char" redundantly redefines the comment character to be the pipe character. The new comment character is in effect only following the [Comment Char] keyword. The following characters MAY be used:

```
! " # $ % & ' ( ) * , : ; < > ? @ \ ^ ` { | } ~
```

Other Notes
The [Comment Char] keyword can be used anywhere in the file, as desired.

```
[Comment Char]    |_char
```

Keyword [File Name]

Required Yes

Description
Specifies the name of the IBIS file.

Usage Rules
The file name must conform to the rules in paragraph 3 of Section 3, General Syntax Rules and Guidelines. In addition, the file name must use the extension ".ibs", ".pkg", or or ".ebd". The file name must be the actual name of the file.

```
[File Name]       ver5_0.ibs
```

5 Component Description

Keyword [Component]

Required Yes

Description
Marks the beginning of the IBIS description of the integrated circuit named after the keyword.

Sub-Params
Si_location, Timing_location

Usage Rules
If the .ibs file contains data for more than one component, each section must begin with a new [Component] keyword. The length of the component name must not exceed 40 characters, and blank characters are allowed.

NOTE: Blank characters are not recommended due to usability issues.

Si_location and Timing_location are optional and specify where the Signal Integrity and Timing measurements are made for the component. Allowed values for either subparameter are 'Die' or 'Pin'. The default location is at the 'Pin'.

```
[Component]     7403398 MC452
|
Si_location     Pin    | Optional subparameters to give measurement
Timing_location Die    | location positions
```

Keyword [Manufacturer]

Required Yes

Description
Specifies the name of the component's manufacturer.

Usage Rules
The length of the manufacturer's name must not exceed 40 characters (blank characters are allowed, e.g., Texas Instruments). In addition, each manufacturer must use a consistent name in all .ibs files.

```
[Manufacturer]  Intel Corp.
```

Keyword [Package]

Required Yes

Description
Defines a range of values for the default packaging resistance, inductance, and capacitance of the component pins.

Sub-Params
R_pkg, L_pkg, C_pkg

Usage Rules
The typical (typ) column must be specified. If data for the other columns are not available, they must be noted with "NA".

Other Notes
If RLC parameters are available for individual pins, they can be listed in columns 4-6 under keyword [Pin]. The values listed in the [Pin] description section override the default values defined here. Use the [Package Model] keyword for more complex package descriptions. If defined, the [Package Model] data overrides the values in the [Package] keyword. Regardless, the data listed under the [Package] keyword must still contain valid data.

```
[Package]
| variable      typ            min            max
R_pkg           250.0m         225.0m         275.0m
L_pkg           15.0nH         12.0nH         18.0nH
C_pkg           18.0pF         15.0pF         20.0pF
```

Keyword [Pin]

Required Yes

Description
Associates the component's I/O models to its various external pin names and signal names.

6 Model Statement

Keyword [Model]

Required Yes

Description
Used to define a model, and its attributes.

Sub-Params
Model_type, Polarity, Enable, Vinl, Vinh, C_comp, C_comp_pullup, C_comp_pulldown, C_comp_power_clamp, C_comp_gnd_clamp, Vmeas, Cref, Rref, Vref

Usage Rules
Each model type must begin with the keyword [Model]. The model name must match the one that is listed under a [Pin], [Model Selector] or [Series Pin Mapping] keyword and must not contain more than 40 characters. A .ibs file must contain enough [Model] keywords to cover all of the model names specified under the [Pin], [Model Selector] and [Series Pin Mapping] keywords, except for those model names that use reserved words (POWER, GND and NC).

Model_type must be one of the following:
Input, Output, I/O, 3-state, Open_drain, I/O_open_drain, Open_sink, I/O_open_sink, Open_source, I/O_open_source, Input_ECL, Output_ECL, I/O_ECL, 3-state_ECL, Terminator, Series, and Series_switch.

For true differential models documented under Section 6b, Model_type must be one of the following:
Input_diff, Output_diff, I/O_diff, and 3-state_diff

Special usage rules apply to the following. Some definitions are included for clarification:

Input, I/O, I/O_open_drain, I/O_open_sink, I/O_open_source
These model types must have Vinl and Vinh defined. If they are not defined, the parser issues a warning and the default values of Vinl = 0.8 V and Vinh = 2.0 V are assumed.

Input_ECL, I/O_ECL
These model types must have Vinl and Vinh defined. If they are not defined, the parser issues a warning and the default values of Vinl = -1.475 V and Vinh = -1.165 V are assumed.

Terminator
This model type is an input-only model that can have analog loading effects on the circuit being simulated but has no digital logic thresholds. Examples of terminators are: capacitors, termination diodes, and pullup resistors.

```
      [bunch of stuff, including a diagram, left out for now. Ed.]

|
[Model]         External_Model_Diff
Model_type      I/O_diff              | Requires [External Model]
Polarity        Non-Inverting
Enable          Active-High
| The [Diff Pin] vdiff value overrides the thresholds below
```

```
Vinl = 0.8V                          | Input logic "low" DC voltage, if any
Vinh = 2.0V                          | Input logic "high" DC voltage, if any
|                         | The true differential measurement point is at
|                         | the crossover voltage
|                         | The Vmeas value is overridden
Vmeas = 1.5V              | Reference voltage for timing measurements
|                         | Single-ended timing test load is still permitted
Cref = 5pF                | Timing specification test load capacitance value
Rref = 500                | Timing specification test load resistance value
Vref = 0                  | Timing specification test load voltage
|                         | These new subparameters are permitted for
|                         | single-ended differential operation based on the
|                         | [Diff Pin] keyword
Rref_diff = 100           | Timing specification differential resistance value
Cref_diff = 5pF           | Timing specification differential capacitance value
```

Keyword [Model Spec]

Required No

Sub-Params
Vinh, Vinl, Vinh+, Vinh-, Vinl+, Vinl-, S_overshoot_high, S_overshoot_low, D_overshoot_high, D_overshoot_low, D_overshoot_time, D_overshoot_area_h, D_overshoot_area_l, D_overshoot_ampl_h, D_overshoot_ampl_l, Pulse_high, Pulse_low, Pulse_time, Vmeas, Vref, Cref, Rref, Cref_rising, C_ref_falling, Rref_rising, Rref_falling, Vref_rising, Vref_falling, Vmeas_rising, Vmeas_falling, Rref_diff, Cref_diff

Description
The [Model Spec] keyword defines four columns under which specification subparameters are defined.
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