**BUFFER ISSUE RESOLUTION DOCUMENT (BIRD)**

**BIRD NUMBER:** 184.2

**ISSUE TITLE:** Model\_name and Signal\_name Restriction for POWER and GND Pins

**REQUESTOR:**  Bob Ross, Teraspeed Labs

**DATE SUBMITTED:** September 1, 2016

**DATE REVISED:** September 16, 2016; December 6, 2016

**DATE ACCEPTED:** January 6, 2017

**DEFINITION OF THE ISSUE:**

This BIRD adds a new requirement to [Pin] keyword Usage Rules that "If any pin has model\_name POWER, then all other pins with the same signal\_name as this pin must have model\_name POWER. If any pin has model\_name GND, then all other pins with the same signal\_name as this pin must have model\_name GND."

BIRD180.X deals with an omission in the IBIS 6.1 specification where there is no statement regarding uniqueness of pin names in the first column of a [Pin] section. This BIRD does not include this rule to keep the issues separate.

**SOLUTION REQUIREMENTS:**

The IBIS specification must meet these requirements:

**Table 1: Solution Requirements**

|  |  |
| --- | --- |
| **Requirement** | **Notes** |
| 1. Keep editorial changes in BIRD180.X for [Pin] Usage Rules
 | Must 🡪 Shall, add CIRCUITCALL |
| 1. Delete "which shall not be repeated within the same [Pin] keyword for a [Component]" to allow two technical issues to be considered separately as BIRD180.X and this BIRD
 | Covered in BIRD180.X, deleted here due to possible interest in BIRD125.1, which proposes a method for using duplicate [Pin Numbers] |
| 1. Add "If two POWER or GND pins have the same signal\_name, they must have the same model\_name"
 | New Rule |
| 1. If both BIRD180.X and this BIRD are approved, the content can be merged (Or the BIRDs can be merged into one BIRD)
 | All other changes in BIRD180.X and this BIRD should track each other |

(Enumerate each requirement in the table above, adding rows as needed.)

**SUMMARY OF PROPOSED CHANGES:**

[Pin] keyword Usage Rules adds some editorial text and also adds a new rule listed below.

**Table 2: IBIS Keywords, Subparameters, AMI Reserved\_Parameters, and AMI functions Affected**

|  |  |  |
| --- | --- | --- |
| **Specification Item** | **New/Modified/Other** | **Notes** |
| [Pin] keyword Usage Rules | Modified | Retain editorial changes of BIRD180.XDelete "which shall not be repeated within the same [Pin] keyword for a [Component] in BIRD180.X"Add "If any pin has model\_name POWER, then all other pins with the same signal\_name as this pin must have model\_name POWER. If any pin has model\_name GND, then all other pins with the same signal\_name as this pin must have model\_name GND."" |

**PROPOSED CHANGES:**

Change:

Keyword: **[Pin]**

*Required:* Yes

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

*Sub-Params:* signal\_name, model\_name, R\_pin, L\_pin, C\_pin

*Usage Rules:* All pins on a component must be specified. The first column must contain the pin name. The second column, signal\_name, gives the data book name for the signal on that pin. The third column, model\_name, maps a pin to a specific I/O buffer model or model selector name. Each model\_name must have a corresponding model or model selector name listed in a [Model] or [Model Selector] keyword below, unless it is a reserved model name (POWER, GND, or NC).

to:

Keyword: **[Pin]**

*Required:* Yes

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

*Sub-Params:* signal\_name, model\_name, R\_pin, L\_pin, C\_pin

*Usage Rules:* For a full component description, all pins on a component should be specified. The first column shall contain the pin name. (The pin name column is also referred to as pin\_name elsewhere in this document). The second column, signal\_name, gives the data book name for the signal on that pin. The third column, model\_name, maps a pin to a specific I/O buffer model or model selector name. Each model\_name shall have a corresponding model or model selector name listed in a [Model] or [Model Selector] keyword below, unless it is a reserved model name (POWER, GND, CIRCUITCALL, or NC).

If a pin has model\_name POWER, then all other pins with the same signal\_name as this pin shall have model\_name POWER. If a pin has model\_name GND, then all other pins with the same signal\_name as this pin shall have model\_name GND.

Note, where in conflict, the changes in this BIRD override the changes in BIRD180 with the exception that the change in the sentence below approved in BIRD180 is retained:

The first column shall contain the pin name, which shall not be repeated within the same [Pin] keyword for a [Component].

**ANALYSIS PATH/DATA THAT LED TO SPECIFICATION:**

The new statement is added as a new "paragraph' after both signal\_name and model\_name column entries have been defined in the previous paragraph. This also highlights a change for the parser developer.

This new rule (not specified or enforced in existing versions of the IBIS Specification is targeted to POWER and GND model\_name entries to avoid possible conflicts with the same signal\_name used for both a POWER and GND pin. However, the new rule can apply to all pins because data books do use different signal\_names for each non-POWER or non-GND pins

The addition is to apply the rule only to POWER or GND pins. This simplifies parser checking, and the more general statement is not needed for the pending Interconnect Specification that uses only pin\_names for I/O pins. Note, in a commercial model based on data sheet information, there would not be similar signal\_names for I/O pins.

**ANY OTHER BACKGROUND INFORMATION:**

Walter Katz proposed the language in the ATM Task Group in the BUSLabelBIRD\_1.docx, July 12, 2016 (it may have been proposed elsewhere or earlier). Walter could be listed as the primary author.

A revised language was proposed by Walter to Bob Ross on August 30, 2016. It clarifies the intent and broadens the rule so that if any pin has a model\_name POWER, then its signal\_name must not be used for any other pins except those with model\_name POWER. Similarly for model\_name GND pins. The earlier statement could have been interpreted to not exclude NC or even I/O model\_names sharing the same signal\_name as a POWER or GND pin.

BIRD184.1 changes "any" to "a" in the added paragraph.

BIRD184.2 makes editorial corrections submitted by Michael Mirmak and also discussed at the December 6, 2016 ATM meeting. BIRD184.2 was accepted by the IBIS Open Forum January 6, 2017.