**BUFFER ISSUE RESOLUTION DOCUMENT (BIRD)**

**BIRD NUMBER: 195.1**

**ISSUE TITLE:** Enabling [Rgnd] and [Rpower] Keywords for Input Models

**REQUESTOR:**  Michael Mirmak, Intel Corp.

**DATE SUBMITTED:** June 19, 2018

**DATE REVISED:** June 29, 2018

**DATE ACCEPTED:** August 31, 2018

**DEFINITION OF THE ISSUE:**

The Terminator Model\_type keywords [Rpower], and [Rgnd] would be highly convenient for describing the analog electrical behavior of receivers for Algorithmic Models using simple circuits. However, the IBIS 6.1 specification specifically prohibits the use of Model\_type Terminator with the [Algorithmic Model] keyword, and the [Rpower] and [Rgnd] keywords are not available for any Model\_type other than Terminator. This BIRD enables the [Rpower] and [Rgnd] keywords under the Input Model\_type, to ease creation of simple input models for Algorithmic Modeling purposes.

**SOLUTION REQUIREMENTS:**

The IBIS specification must meet these requirements:

Table 1: Solution Requirements

|  |  |
| --- | --- |
| Requirement | Notes |
| 1. Permit the [Rpower] and [Rgnd] keywords to be used under the Input Model\_type. |  |
| 1. Make any clarifications needed for unambiguous parsing. |  |

**SUMMARY OF PROPOSED CHANGES:**

For review purposes, the proposed changes are summarized as follows:

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

|  |  |  |
| --- | --- | --- |
| Specification Item | New/Modified/Other | Notes |
| Restriction on [Rgnd] and [Rpower] being used only with Model\_type Terminator. | Modified | [Rgnd] and [Rpower] may be used with Model\_type Input and Model\_type Input\_ECL as well. |
| Rules for [Rac] and [Cac] usage | Modified | Clarified that [Rac] and [Cac] are only to be used together and cannot be used independently of each other. |
| Rules for C\_comp and [Rac], [Cac], [Rgnd] and [Rpower] | Modified | Clarified that the C\_comp and C\_comp\_\* subparameters are supported with these keywords, and that C\_comp is still required for [Model] |

**PROPOSED CHANGES:**

All page numbers refer to the Adobe\* PDF version of the document.

1. In IBIS version 6.1, change the [Model] keyword “Other Notes” section on p. 34 from:

*Other Notes:* A complete [Model] description normally contains the following keywords:  
[Voltage Range], [Pullup], [Pulldown], [GND Clamp], [POWER Clamp], and [Ramp]. A  
Terminator model may use the [Rgnd], [Rpower], [Rac], and [Cac] keywords. However, some  
models may have only a subset of these keywords. For example, an input structure normally only  
needs the [Voltage Range], [GND Clamp], and possibly the [POWER Clamp] keywords. If any of  
[Rgnd], [Rpower], [Rac], and [Cac] keywords is used, then the Model\_type must be Terminator.

… to …

*Other Notes:* A complete [Model] description normally contains the following keywords:  
[Voltage Range], [Pullup], [Pulldown], [GND Clamp], [POWER Clamp], and [Ramp]. A  
Terminator model may use the [Rgnd] and/or [Rpower] keywords, as well as the [Rac] and [Cac] keyword pair. The [Rgnd] and [Rpower] keywords may appear in [Model] descriptions using other Model\_types. However, some models may have only a subset of these keywords. For example, an input structure normally only needs the [Voltage Range], [GND Clamp], and possibly the [POWER Clamp] keywords. If the [Rac] and [Cac] keyword pair is used, then the Model\_type must be Terminator.

1. In IBIS version 6.1, change the [Rgnd],[Rpower],[Rac],[Cac] keyword “Other Notes” section on p. 61 from:

*Other Notes:* [Rpower] is connected to “Vcc” and [Rgnd] is connected to “GND”. However,  
[GND Clamp Reference] voltages, if defined, apply to [Rgnd]. [POWER Clamp Reference]  
voltages, if defined, apply to [Rpower]. Either or both [Rgnd] and [Rpower] may be defined and  
may coexist with [GND Clamp] and [POWER Clamp] tables. If the terminator consists of a series  
R and C (often referred to as either an AC or RC terminator), then both [Rac] and [Cac] are  
required. When [Rgnd], [Rpower], or [Rac] and [Cac] are specified, the Model\_type must be  
Terminator.

… to…

*Other Notes:* [Rpower] is connected to “Vcc” and [Rgnd] is connected to “GND”. However,  
[GND Clamp Reference] voltages, if defined, apply to [Rgnd]. [POWER Clamp Reference]  
voltages, if defined, apply to [Rpower]. Either or both [Rgnd] and [Rpower] may be defined and  
may coexist with [GND Clamp] and [POWER Clamp] tables. If the terminator consists of a series  
R and C (often referred to as either an AC or RC terminator), then both [Rac] and [Cac] are  
required; these two keywords shall only be used together for any given [Model]. When [Rac] and [Cac] are specified, the Model\_type shall be Terminator. [Rgnd] and [Rpower] may be used with Model\_type Terminator, Model\_type Input, or Model\_type Input\_ECL. The C\_comp subparameter is required for [Model]s using any or all of these keywords; the C\_comp\_\* subparameters may be used in the same [Model] with any or all of these keywords.

**BACKGROUND INFORMATION/HISTORY:**

This was the topic of discussions in several IBIS-ATM Task Group meetings during May and June 2018. The ATM Task Group voted June 19, 2018 to recommend submission of the BIRD to the IBIS Open Forum.

BIRD195.1 is issued after feedback from Bob Ross of Teraspeed Labs. The word “Algorithmic” is removed from the title, as the change is not limited to algorithmic input models. In addition, Input\_ECL is added as a supported Model\_type.

\* Other names and brands may be claimed as the property of others