**BUFFER ISSUE RESOLUTION DOCUMENT (BIRD)**

(See instructions starting on template page two)

**BIRD NUMBER:** 227

**ISSUE TITLE:** AMI Ignore Block Feature

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**DATE SUBMITTED:** November 14, 2023

**DATE REVISED:**

**DATE ACCEPTED:** January 5, 2024

**DEFINITION OF THE ISSUE:**

Adequate setting of AMI’s Ignore\_Bits keyword is critical to ensure accurate representation of a sophisticated SerDes RX AMI beyond the stage of equalization (EQ) adaptation to compensate for channel length. These models need to recover the clock, i.e., the sampling point while driving toward a final EQ state. However, the required number of ignore bits is a function of the channel at hand.

Setting of Ignore\_Bits has a direct impact on simulation time as it controls how much of the simulation needs to be discarded. Say we have a majority *M* out of *N* channels requiring *I* ignore bits and the remaining minority of *(N-M)* channels requiring *J* ignore bits. If *J* is dramatically larger than *I*, we would need to set Ignore\_Bits to the larger amount for all channels, thus wasting considerable computational time -- on the order of *(J-I)* bits -- for most simulations. We have seen this problem in practice.

Sophisticated receivers already “know” when they have completely locked, and EQ adaptation has reached the tracking or relatively stationary mode. Thus, we solve this problem by letting the RX model report in a boolean output parameter that its output is in tracking mode. This automatic ignoring mechanism uses the existing Ignore\_Bits parameter to limit the number of blocks automatically ignored in this fashion, to prevent potentially never-ending simulations that should yield closed eyes. This solution will work provided the block size is small enough for observability.

**SOLUTION REQUIREMENTS:**

The IBIS specification must meet these requirements:

Table : Solution Requirements

|  |  |
| --- | --- |
| Requirement | Notes |
| 1. Optionally define boolean parameter “Adaptation\_Valid” that will be false until it becomes true with RX AMI locking that may optionally be used by EDA tools.
 | Model parameter turning on the automatic block ignoring that will also utilize Ignore\_Bits of the model as the maximum number of bits to ignore. |

**SUMMARY OF PROPOSED CHANGES:**

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

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

|  |  |  |
| --- | --- | --- |
| Specification Item | New/Modified/Other | Notes |
| Adaptation\_Valid | New |  |

**PROPOSED CHANGES:**

*Parameter:* **Adaptation\_Valid**

*Required:* No, and illegal before IBIS 7.3

*Direction:* Rx

*Descriptors:*

Usage: Out

Type: Boolean

Format: Value

Default: <Boolean\_literal>

Description: <string>

*Definition:* Indicates the EQ tracking status or locking status of an RX AMI, which becomes 1 when the simulation data of that block can be consumed for eye generation.

*Usage Rules:*  This is an optional, boolean output parameter that will indicate to the EDA tool that the block of bits in question should be ignored or discarded provided the tracking mode is False and consumed for eye accumulation when it becomes True. If the EDA tool chooses to implement this automatic ignoring mechanism, it will start accumulating bits for eye diagram starting with the next block because the model is allowed to report true provided the locking is successful anywhere in the relevant block. EDA tools have the option to ignore this parameter at the expense of potential runtime penalty for any reason including asynchronous locking ambiguities in case multiple RX AMIs are simulated together. Additionally, Ignore\_Bits should be set large enough to handle the slowly locking channels. As aforementioned, Ignore\_Bits serves as the maximum number of bits to ignore if this automatic ignoring mechanism is implemented.

*Example:*

(Adaptation\_Valid (Usage Out) (Type Boolean) (Value False) (Description “Control automatic ignoring of current block of simulation.”))

**BACKGROUND INFORMATION/HISTORY:**

(Relevant notes regarding history, discussions, and revisions go here.)