**BUFFER ISSUE RESOLUTION DOCUMENT (BIRD)**

**BIRD NUMBER: 197.3\_draft\_2**

**ISSUE TITLE:** New AMI Reserved Parameter DC\_Offset

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**DATE REVISED:** December 4, 2018, January 15, 2019

**DATE ACCEPTED:**

**DEFINITION OF THE ISSUE:**

AMI modeling is now being applied to single-ended channels (e.g. DDR5). The current input to AMI\_Init is an Impulse Response. This forces all AMI simulations to be centered around the mid-level of the signal of a single-ended port. A DLL may need to know the single-ended voltage levels (e.g. to handle saturation in a DFE summer). This BIRD proposes a new AMI Reserved Parameter DC\_Offset, which is the mid value of the beginning and end of the step response of the channel.

**SOLUTION REQUIREMENTS:**

The IBIS specification must meet these requirements:

Table 1: Solution Requirements

|  |  |
| --- | --- |
| Requirement | Notes |
| 1. Allow the EDA tool to convey to the model the mid-point of the steady state high and low voltages found during analog model characterization of single-ended signals.
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**SUMMARY OF PROPOSED CHANGES:**

Add new AMI Reserved Parameter DC\_Offset.

**PROPOSED CHANGES:**

*Parameter:* **DC\_Offset**

*Required:* No, and illegal before AMI\_Version X.x

*Direction:* Rx

*Descriptors:*

Usage:                   In

Type:                     Float

Format:                  Value

Default:                 <numeric\_literal>

Description:<string>

*Definition:* The mean value of the steady state high and low voltage of the channel at the Rx pad.

*Usage Rules:* If the impulse response was generated by differentiating the step response, then the value of DC\_Offset should be the same as the average of the step response initial and final voltages.

The AMI\_Init function can use this value to determine the voltages inside of the model.

It is also assumed that the waveform input to the Rx AMI\_GetWave function is the waveform minus this DC\_Offset. The Rx AMI\_GetWave function can choose to construct the single-ended waveform by adding DC\_Offset to the input waveform. The waveform output of the Rx AMI\_GetWave shall be adjusted so that the EDA tool can add DC\_Offset to get the voltage of the waveform at the slicer (aka latch, decision point) of the single-ended port.

*Other Notes:* It is the responsibility of the EDA tool to determine the DC\_Offset. The EDA tool may use any method to do this.

*Example:*

DC\_Offset (Usage In) (Type Float) (Value 0.5)

(Description “The EDA tool is responsible for determining the DC\_Offset value to input to the executable model.”)

**BACKGROUND INFORMATION/HISTORY:**

Typographical updates made in BIRD197.1, based on feedback from Open Forum and ATM review.

BIRD197.2 contains additional editorial changes.

BIRD197.3 contains editorial changes to the verbiage related to the usage of the words “single-ended”.