**BUFFER ISSUE RESOLUTION DOCUMENT (BIRD)**

**BIRD NUMBER:** 209

**ISSUE TITLE:** Make Clock Times Output Required for Clock Executable Models

**REQUESTOR:**  Arpad Muranyi, Siemens Digital Industries Software

**DATE SUBMITTED:** January 28, 2021

**DATE REVISED:**

**DATE ACCEPTED:** March 12, 2021

**DEFINITION OF THE ISSUE:**

BIRD204 suggests that when a Clock executable model does not have an AMI\_GetWave function, the waveform or clock times should be supplied by the EDA tool for the Data AMI\_GetWave function. This can be achieved easily for waveforms because the EDA tool can implement a simple “passthrough” functionality in place of a missing AMI\_GetWave function, but it poses serious complications when the Data executable model expects clock times. The EDA vendor may not have the information and/or algorithm(s) available that the author of the AMI model or the manufacturer of the actual device has, potentially making the clock times generated by the EDA tool ficticious or inaccurate. In addition, the information whether the Clock executable model returns clock times is not available to the EDA tool until the simulation is well under way or finished, which poses additional complications for the EDA tool in the decision making process on when it should generate clock times for the Data executable model. To eliminate these problems, it would be best to make it required for the Clock executable model to have an AMI\_GetWave function which returns clock times when the Data executable model expects clock times.

Additionally, a spelling error needs to be corrected in *Usage Rules*: the allowed value “Wave” should be singular (not plural).

**SUMMARY OF PROPOSED CHANGES:**

Replace the text in the *Usage Rules* and the *Other Notes* sections of BIRD204 with the text proposed in this BIRD.

**PROPOSED CHANGES:**

**Change the text highlighted in yellow (in BIRD204):**

*Parameter:* **Rx\_Use\_Clock\_Input**

*Required:* No, and illegal before AMI\_Version 7.1

*Direction:* Rx

*Descriptors:*

Usage: In

Type:                     String

Format: List, Value

Default:                 *<*string\_literal>

Description:*<*string>

*Definition:* Specifies the content of the Data Rx AMI\_GetWave clock\_times input supported by the model. The three possible content types are: (1) to be ignored, (2) the clock\_times and (3) the wave output of the Clock Rx AMI\_GetWave. If this parameter is present in the .ami file, the EDA tool is responsible to pass the selected value to the AMI\_Init function.

*Usage Rules:* Allowed values are “None”, “Times” and “Waves”. If omitted, the default is “None”. If “None” is selected, then the content of clock\_times will be ignored by the model. If “Times” is selected, then the EDA tool will use the clock\_times values that were output by the Clock Rx AMI\_GetWave call as the clock\_times values in the call to the Data Rx AMI\_GetWave. If “Wave” is selected, then the EDA tool will use the wave values that were output by the Clock Rx AMI\_GetWave call as the clock\_times values in the call to the Data Rx AMI\_GetWave.

*Other Notes:* The wave input to both Data and Clock shall have the same block size and sample\_interval. For “Times” and “Wave” options, if the Clock does not have a DLL or has a DLL without an AMI\_GetWave, then the EDA tool should effectively insert a passthrough Clock AMI\_GetWave function to create the wave or clock\_times output vector required by the Data AMI\_GetWave clock\_times input.

*Example:*

(Rx\_Use\_Clock\_Input (Usage In) (Type String) (List “None” “Times”)

(Description "The model can use the Clock AMI\_GetWave output clock\_times

 to sample the Data waveform at the Rx Data latch"))



**to the text highlighted in green below:**

*Parameter:* **Rx\_Use\_Clock\_Input**

*Required:* No, and illegal before AMI\_Version 7.1

*Direction:* Rx

*Descriptors:*

Usage: In

Type:                     String

Format: List, Value

Default:                 *<*string\_literal>

Description:*<*string>

*Definition:* Specifies the content of the Data Rx AMI\_GetWave clock\_times input supported by the model. The three possible content types are: (1) to be ignored, (2) the clock\_times and (3) the wave output of the Clock Rx AMI\_GetWave. If this parameter is present in the .ami file, the EDA tool is responsible to pass the selected value to the AMI\_Init function.

*Usage Rules:* Allowed values are “None”, “Times” and “Wave”. If omitted, the default is “None”. If “None” is selected, then the content of clock\_times will be ignored by the model. If “Times” is selected, then the EDA tool will use the clock\_times values that were output by the Clock Rx AMI\_GetWave call as the clock\_times values in the call to the Data Rx AMI\_GetWave. If “Wave” is selected, then the EDA tool will use the wave values that were output by the Clock Rx AMI\_GetWave call as the clock\_times values in the call to the Data Rx AMI\_GetWave.

*Other Notes:* The wave input to both Data and Clock shall have the same block size and sample\_interval. For the “Wave” option, if the Clock does not have a DLL or has a DLL without an AMI\_GetWave, then the EDA tool should effectively insert a passthrough Clock AMI\_GetWave function to make the clock waveform available for the Data AMI\_GetWave clock\_times input. For the "Times" option, the Clock shall have a DLL with an AMI\_GetWave that returns clock\_times.

*Example:*

(Rx\_Use\_Clock\_Input (Usage In) (Type String) (List “None” “Times”)

(Description "The model can use the Clock AMI\_GetWave output clock\_times

 to sample the Data waveform at the Rx Data latch"))



**BACKGROUND INFORMATION/HISTORY:**

The option of making this change as an editorial correction was discussed in emails and in the IBIS Advanced Technology Modeling Task Group teleconference on January 26, 2021, and the decision was made to submit a new BIRD with this change to supersede BIRD204.