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PI3EQX10904 IBIS-AMI Model

User Guide

RevB

2019/07/31

1. Introduction

This document describes the organization, structure, and proper usage of the PI3EQX10904 IBIS-AMI models (compiled and approved for external customer release), hereafter referred to as the “model” for short. The model is intended for use by the PI3EQX10904 customers for system-level modeling and verification. This document assumes that you are familiar with the relevant IBIS-AMI modeling specifications.

1.1 Charter of the IBIS-AMI models

The models are designed in accordance with the [IBIS-AMI standard](#) and attempt to model the significant characteristics of most components in the PI3EQX10904. The models are not intended to be an exact representation of PI3EQX10904 components implemented. Rather, the models seek to provide as high a degree of accuracy as is feasible outside of Spice-based models and simulations.

1.2 Is / Is Not Table

The following table describes the features and purposes of the models, as well as the limitations of the models.

Table 1: Model Is / Is Not Table

Is	Is Not
Compiled for 64 bit AMI EDA tool that run in Windows platform	Compiled for any other platform (i.e. 32-Linux)
Compliant to IBIS-AMI 5.1	Compliant to a more recent BIRD revisions, if they exist
<i>Model of PI3EQX10904 functionality, non-idealities, and performance</i>	<i>Exact representation of implemented components</i>

2. About This Release

2.1 IBIS-AMI Model Files

Table 2 shows the key IBIS-AMI model files delivered with the model release as part of the compressed archive.

Table 2: IBIS-AMI files included with the model release

File Name	Type	Description
PI3EQX10904_Redriver.ibs	IBIS	Top-level IBIS wrapper for the Tx and Rx AMI model
PI3EQX10904_Rx.ibs	IBIS	IBIS wrapper for Rx AMI model
PI3EQX10904_Rx.ami	AMI	Parameters file for the Rx model as required by the IBIS-AMI standard. This is a text file which is common for all OS/execution platforms.
PI3EQX10904_Rx_x64.dll	DLL	Windows 64-bit compiled shared library for the Rx model. This shared library includes the AMI_Init, AMI_GetWave, and AMI_Close functions defined in the IBIS-AMI standard.
PI3EQX10904_Tx.ibs	IBIS	IBIS wrapper for the Tx AMI model
PI3EQX10904_Tx.ami	AMI	Parameters file for the Tx model as required by the IBIS-AMI standard. This is a text file which is common for all OS/execution platforms.
PI3EQX10904_Tx_x64.dll	DLL	Windows 64-bit compiled shared library for the Tx model. This shared library includes the AMI_Init, AMI_GetWave, and AMI_Close functions defined in the IBIS-AMI standard.
PI3EQX10904_IBIS_AMI_user_guide.pdf	PDF	PI3EQX10904 AMI model user guide.

2.2 Model Specific Parameters

PI3EQX10904 model consists of receiver and transmitter models. EDA tool is responsible for cascading the receiver to the transmitter to form a redriver to perform signal integrity analysis.

The following tables describe the details of EQ/FG/SW parameter settings.

Table 3. Model Specific Parameters for Receiver

Parameter	Description and Setting
EQ	0 to 15. Control the receiver equalization amount.
FG	0 to 3. Control the transmitter flat gain amount.
SW	0 to 3. Control the transmitter output swing amount.

Table 3.1 EQ Settings

EQ	EQ<2:0> PIN LEVEL	EQ Gain at 6 GHz (dB)
0	0000 B	9.6dB
1	0001 B	10.4dB
2	0010 B	11.0dB
3	0011 B	11.6dB
4	0100 B	12.2dB
5	0101 B	12.8dB
6	0110 B	13.4dB
7	0111 B	13.9dB
8	1000 B	14.4dB
9	1001 B	14.8dB
10	1010 B	15.3dB
11	1011 B	15.7dB
12	1100 B	16.1dB
13	1101 B	16.4dB
14	1110 B	16.8dB
15	1111 B	17.1dB

Table 3.2 FG Settings

FG	FG<1:0> PIN LEVEL	Flat Gain (dB)
0	00 B	-3.5
1	01 B	-1.5
2	10 B	0.5
3	11 B	2.5

Table 3.3 SW Settings

SW	SW<1:0> PIN LEVEL	Output Swing (mVppd)
0	00 B	700
1	01 B	800
2	10 B	900
3	11 B	1000

2.3 Application Notes for Simulation

- ◆ Only 'Typical' corner is included in this model.
- ◆ This model is designed to work properly at up to 10 Gbps.
- ◆ Default value for “rx_samplerate/tx_samplerate” of AMI model is 32*10e9. You don't need to change it unless your Simulation works at a higher sample rate for better accuracy, e.g. 64*10e9.
- ◆ For better eye performance observation, traces with proper loss (corresponding to EQ's dB value) should be used in simulation.
- ◆ Output magnitude of the redriver will be limited if input swing goes too large (e.g. > 1.2 Vppd)

3. Model Revision History

Revision	Date	Description	Built by	Verified by
RevB	2019/07/31	Improve model consistency with datasheet	Chen Xiang	