SerDes Modeling: IBIS-AMI Evaluation Toolkit

Presented by: Todd Westerhoff, SiSoft
twesterh@sisoft.com

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Challenges

• IBISCHK cannot check compiled models
  – Similar problem to AMS model calls

• Several possible sources of platform/model incompatibility
  – Incorrect EDA tool implementation
  – Incorrect model implementation
  – Incompatible run-time libraries

• A “reference standard” for IBIS-AMI is needed
  – Reference platform implementation
  – Reference model implementation
IBIS_AMI_Test

- Allows IBIS-AMI .dll models to be run as standalone “executables”
  - Facilitates model debug
  - Provides standard environment for testing model compliance
- Authored by SiSoft, source code to be turned over to IBIS Open Forum
  - Executable will be publicly available
IBIS_AMI_Tx Model

AMI File
- Reference IBIS & AMI files
- Reference Algorithmic model
  - Impulse response and waveform processing
  - 4 tap equalizer
    - Pre-cursor tap
    - Cursor tap
    - 2 post-cursor taps
  - Model normalizes tap sum
  - Scalable transmit swing
  - Executable and source code publicly available

Algorithmic Model Code

```c
IBIS_AMI_Tx
{Dll
(linux ibis_ami_tx_lnx.so)
(solaris ibis_ami_tx_suns4.so)
(windows ibis_ami_tx.dll)
}

(Reserved_Parameters
(Ignore_Bits (Type Integer) (Default 21))
(Max_Init_Aggressors (Type Integer) (Default 25))
(Init_Returns_Impulse (Type Bool) (Default True))
(GetWave_Exists (Type Bool) (Default True))
) | End Reserved

(Model_specific
(txtaps
{tapid (Range -1 3) (type int) }
{tapcoeff
{-1 (Range -1.0 0.1 0.1) (Type float) (Default 0.0)}
{0 (Range 1 1.0) (Type float) (Default 1)}
{1 (List -0.1 0 0.1) (Type float) (Default 0.0)}
{2 (Range -0.01 0.02 0.005) (Type float) (Default 0.0)}
{3 (Range -0.01 0.02 0.005) (Type float) (Default 0.0)}
)
) | End !_Model_specific

{tx_freq_offset
{tx_freq_offset (Range 0 150 1) (Type ppm) (Default 0)}
) | End User_DEFINED

) | End IBIS_AMI_Tx
```
IBIS-AMI Evaluation Toolkit

• Goal: allow interested parties to evaluate & develop IBIS-AMI models

• Available on-line from IBIS-ATM task group website and from www.sisoft.com

• Contents
  – IBIS_AMI_Test utility
  – Sample TX model and source code
  – Sample input data, scripts, documentation

• Email discussion group established: ibis-ami-toolkit@freelists.org
Sample Results:
No TX EQ

Impulse Response

Eye Diagram

Signal @ Rx pad, Stimulus
Sample Results:
TX EQ: (-.15, .7,-.125,-.025)*0.8
IBIS-AMI Toolkit

- Provides a “reference implementation” for testing EDA platforms and IBIS-AMI models
- Allows users to assess IBIS-AMI model functionality and performance
- Users can run analyses based on their own designs and channel impulse responses