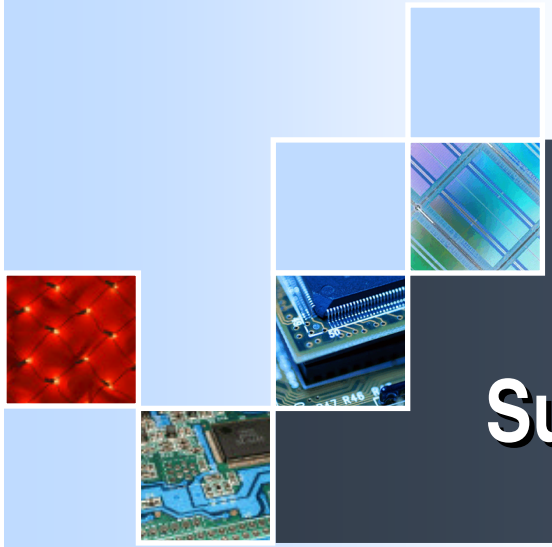
Snowbush IP
A Division of Gennum



BIRD Proposal: Extending IBIS-AMI to Support Back-Channel Communications

IBIS-ATM Committee
March 15, 2011

Marcus Van Ierssel – Snowbush IP (Gennum)
Kumar Keshavan - Sigrity
Ken Willis - Sigrity

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Overview

- Assumptions
- Proposed modifications to support back-channel
- New Reserved_Parameters
- Back-channel AMI file
- Flow changes

Assumptions

- Back-channel functionality will be supported for time domain simulations only; statistical analysis does not apply
- This functionality will be implemented in the AMI_GetWave function

Modifications Required for BIRD

- Enhance AMI_GetWave to allow "AMI_parameters_out" to be taken both into as well as out of the AMI model
  - During training flow only
- New Reserved_Parameters
- Definition of back-channel ami file format
  - Includes new Reserved_Parameters too
- Flow Changes
  - Add back-channel training flow before standard simulation flow

New Reserved_Parameters

- TrainEnable
  - Turns training on/off
- Train
  - Points to .ami file with the back-channel protocol information
  - Both Tx and Rx must point to same file for back-channel communication to occur

Reserved_Parameters > TrainEnable

(TrainEnable (Type Integer) (Format Range 1 0 1)
(Default 1) (Description "Turns training on or off"))

Reserved_Parameters > Train

(Train (Description "This Device can support backchannel training for Standard XYZ.")

(Type String) (Usage In) (Format Value “fullpath_to_training_ami_file\standard_xyz.ami")

(Default “fullpath_to_training_ami_file\standard_xyz.ami"))

Reserved_Parameters > Back-Channel AMI File

- Frame > describes the bit stream used for training
  - Marker
  - Data
    - PRBS
    - Len
  - Trailing
- Max_Train_Bits
  - Max duration of training
- BackChanControls
  - Standard-specific variables passed between Tx and Rx

Back-Channel AMI File Format

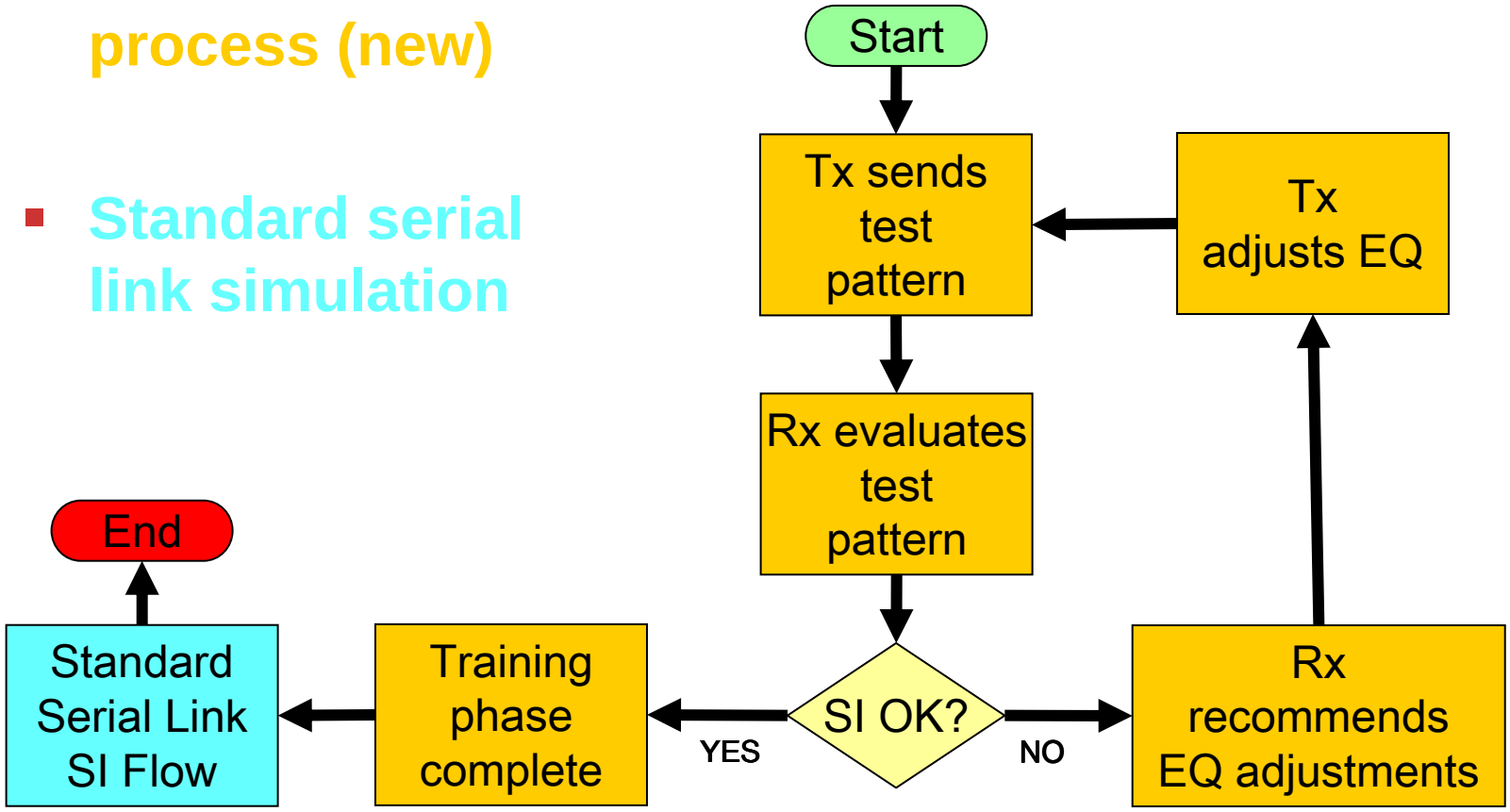
```
(standard_xyz
 (Reserved_Parameters
  (Frame (Description "Defines the training pattern")
   (Marker (Usage In) (Type Integer) (Format Table ( 1 1 1 1  1 1 1 1  1 1 1 1  1 1 1 1  0 0 0 0  0 0 0 0  0 0 0 0  0 0 0 0))
    (Description "Leading marker pattern"))
   (Data
    (PRBS (Usage In) (Type Integer) (Format Value 11) (Default 11) (Description "PRBS order for this specific standard"))
    (Len (Usage In) (Type Integer) (Format Value 4094) (Default 4094) (Description "Length of PRBS bit stream after
        Marker"))
   )
   (Trailing (Usage In) (Type Integer) (Format Table ( 0 0 )) (Description "Trailing zeros"))
  )
  (Max_Train_Bits (Usage In) (Type Integer) (Format Value 500000) (Default 500000) (Description "Number of total training
      bits allowed"))
  (BackChanControls (Description "Reserved parameter. Standard-specific controls are defined under this section.")
   (BC_ControlA (Usage InOut) (Type Integer) (Format List -1 0 1) (Default 0)
                (Description "Parameter name is standard-specific, and can be any legal Type"))
   (BC_ControlB (Usage InOut) (Type Integer) (Format List -1 0 1) (Default 0)
                (Description "Parameter name is standard-specific, and can be any legal Type"))
   (BC_ControlC (Usage InOut) (Type Integer) (Format List -1 0 1) (Default 0)
                (Description "Parameter name is standard-specific, and can be any legal Type"))
  )
 )
)
```

Example of BackChanControls

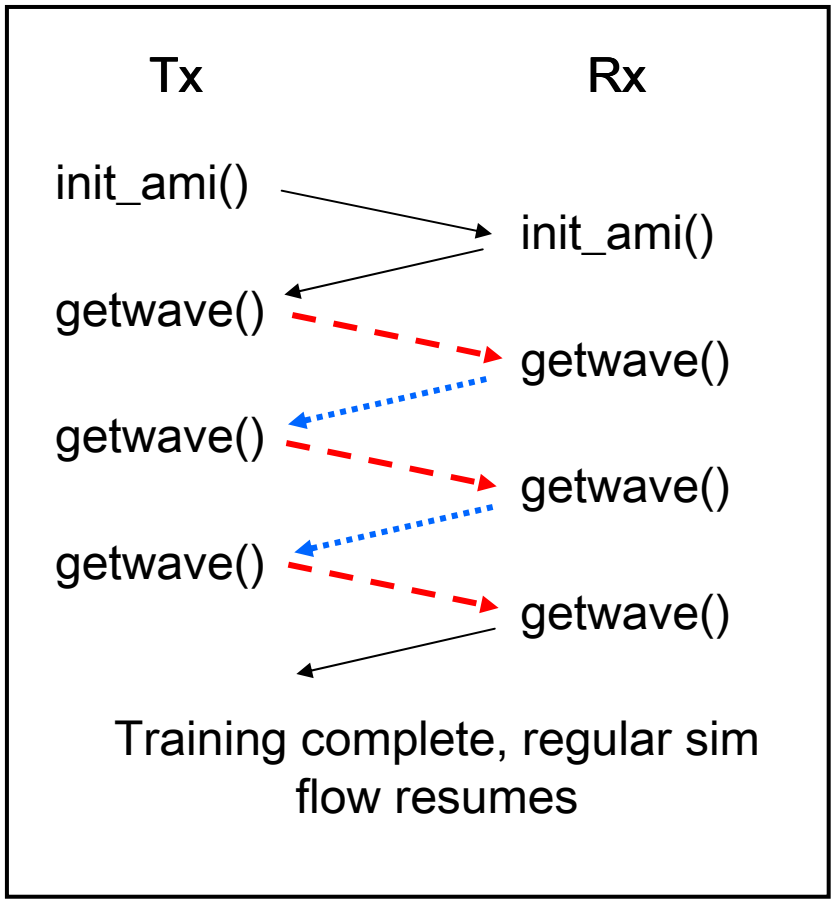
```
(BackChanControls (Description "Reserved parameter. Standard-specific
    controls are defined under this section.")
 (TapIncDec (Description "When written by Rx, -1 means to decrement,
                          0 hold same value, and 1 means to increment.
                          When written by Tx, -1 means low limit has
                          been reached, 0 means the setting is
                          adjustable, and 1 means high limit has been
                          reached.")
  (Tap1 (Usage InOut) (Type Integer) (Format List -1 0 1) (Default 0))
  (Tap2 (Usage InOut) (Type Integer) (Format List -1 0 1) (Default 0))
  (Tap3 (Usage InOut) (Type Integer) (Format List -1 0 1) (Default 0))
 )
)
```

Flow Changes

- **Back-Channel process (new)**
- **Standard serial link simulation**



Back-Channel Flow Detail



Rx AMI updates *BackChanControls* w/ tx eq adaptation commands

Tx AMI updates *BackChanControls* w/ tx eq status

Thank You!