EEE across CAUI

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Contributors, reviewers and supporters

- **Your name here**

Agenda

- **Tx_mode signaling**

- **Rx_mode signaling**

- **Questions…**

Signaling tx_mode across CAUI

- **A mechanism must be defined to signal the tx_mode parameter across the CAUI from the PCS to the PMA/PMD**

Signaling tx_mode across CAUI

- **Use specific codes within the Rapid Alignment Markers**
  - **CD fields currently used for countdown**
  - **Used to synchronize the start of normal alignment markers**

- **Variable count_down is defined & scrambled to produce CD field**

- **According to tx_mode state, set different values for count_down**

PCS – alignment marker insertion

- **Clause 82.2.7**

- **Define RAM as shown before – count_down definition:**

tx_mode	Down_count
DATA	(normal AM operation)
SLEEP	count_down = 135
QUIET	count_down = 154
RF_ALERT	count_down = 173
ALERT	count_down = 183
FW	count_down = 192
RF_WAKE	count_down = dc_start *
WAKE	count_down = dc_start *

When tx_mode transitions to WAKE, count_down is set to dc_start ; count_down then decrements until it reaches zero, after which normal AMs are sent starting 16383 blocks after the terminal RAM

dc_start = 38 (std); 3 (FW)

CD/!CD field in RAM communicates tx_mode to other sublayers across CAUI

NB: PMA/PMD does not transmit RAMs to LP during QUIET/ALERT/FW states

Pros & Cons

- **No change to datapath structure**
  - **Simple to implement in PCS**
  - **Signaling carries across to LP for most states**

- **Only 1 PCS lane sufficient to decode**

- **Layer violation – requires detached PMA to decode 66 blocks**

- **Problem for 2 x CAUI implementation**
  - **If 1st CAUI shut down, PMA must insert for 2nd CAUI**

PMA/PMD – transmit functions

- **Remember!**

- **An integrated PMA can use tx_mode parameters directly**

- **Based on tx_mode – PMA/PMD transmission changes**
  - **DATA/SLEEP/WAKE – normal behavior;**
  - **ALERT - send alert signal;**
  - **FW – send PMA-specific pattern (TBD);**
  - **QUIET – disable Tx**

- **New proposal – just send LPI & RAM in FW state**
  - **(i.e. normal behavior in all states except QUIET & ALERT)**

What to specify

- **PMA/PMD behavior defined according to tx_mode**

- **Use a note to describe how tx_mode may be inferred if no direct connection is available**

- **Note: A PMA/PMD that is separated from the PCS by a CAUI may infer the state of tx_mode by decoding one or more PCS lanes and observing the RAMs present in the data stream.**

Agenda

- **From Baseline …**

- **Tx_mode signaling**

- **Rx_mode signaling etc.**

- **Questions…**

Signaling rx_mode across CAUI

- **A mechanism must be defined to signal the rx_mode parameter (or the state of the received signal) across the CAUI from the PMA/PMD to the PCS**

Signaling rx_mode across CAUI

- **Incoming RAMs are left intact (when received)**
  - **All states other than QUIET, ALERT, RF_ALERT, & FW**
  - **Needs 3 new signals (QUIET, ALERT/RF_ALERT, FW)**
  - **With FW proposal, only 2 new signals – QUIET/ALERT**

- **Use fixed pattern, easy to detect & distinguish**

- **QUIET & FW states are persistent => needs "safe" pattern; ALERT is transitory**

Solution, Pros & Cons

- **ALERT – use the same PMA structure as Tx alert**
  - **(if identical for different PMDs)**

- **QUIET & FW, use PRBS test mode – same for both**
  - **PCS must understand which one was expected**
  - **No confusion if FW proposal accepted**

- **+ No extra h/w in PMA – re-uses alert & test mode logic**

- **- Needs careful thought regarding latency/delays**

PMA/PMD – receive functions

- **Infer rx_mode from incoming signal:**
  - Receiving normal AMs, or RAMs = DATA/SLEEP/WAKE
  - Receiving no signal = QUIET; alert signal = ALERT; specific signaling = FW

- **An integrated PMA can signal receive state to PCS directly**

- **Otherwise, code for signaling across CAUI – PRBS & ALERT**

What to specify

- **PMA/PMD needs to understand the difference between QUIET (no signal); ALERT (new signal); and normal data stream.**

  – **Fundamentally difficult problem – needs some control of expectations.**

  – **(expectations set by PCS state machine in .3az), problem for detached PMA/PMD.**

- **Specify CAUI signaling for DATA/FW (=incoming RAMs); QUIET = PRBS; ALERT = ALERT.**

What to specify (ii)

- **Specify rx_mode inference in general terms based on incoming signal.**
  - Will that be acceptable?.

- **Use note to suggest inference mechanism (as for Tx).**
  - Including "statefulness"
  - Also questionable for a standard.

- **This part needs more thought!**

Agenda

- **From Baseline …**

- **Tx_mode signaling**

- **Rx_mode signaling**

- **Questions…**