

# EEE across CAUI



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**With thanks...**

**With thanks to –**

**all those who participated in  
conference call reviews**

# 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	down_count = 255
QUIET	down_count = 242
RF_ALERT	down_count = 236
ALERT	down_count = 213
FW	down_count = 192
RF_WAKE	down_count = dc_start *
WAKE	down_count = dc_start *

**When tx\_mode transitions to WAKE, down\_count is set to dc\_start ; down\_count 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 1<sup>st</sup> CAUI shut down, PMA must insert for 2<sup>nd</sup> 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/FW – normal behavior;**
  - **ALERT - send alert signal;**
  - **QUIET – disable Tx**
  - **(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.**
- **Comments – 249, 252, 253, 255, 257**

# 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

- **PMA Rx simply forwards whatever is on the line...**
  - Incoming RAMs are left intact (when received)
  - ALERT uses same definition on CAUI as line
  - BUT – QUIET state is problematic (if no CAUI shutdown)
- **Use fixed pattern, easy to detect & distinguish**
- **PMA test mode – PRBS pattern**

# Solution, Pros & Cons

- **ALERT – use the same PMA structure as Tx alert**
  - (if identical for different PMDs)
- **All other modes, no complexity for PMA**
  - PCS must understand incoming RAMs, ALERT & PRBS
- **+ 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
- **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 other.**
  - **Fundamentally difficult problem – needs some control of expectations.**
  - **(expectations set by PCS state machine in .3az), problem for detached PMA/PMD.**

## What to specify (ii)

- **Specify rx\_mode inference in general terms based on incoming signal.**
- **Use note to suggest inference mechanism (as for Tx).**
  - Including “statefulness”
- **PCS rx state machine can also use incoming tx\_mode**
- **Comments – 260, 261, 262, 263**



# Agenda

- From Baseline ...
- Tx\_mode signaling
- Rx\_mode signaling
- Questions...