

PMA Timing for PON

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*Other supporters & feedback
welcome*

Background

- ePON: Faster transition times
 - Better efficiency
 - Low latency services
- PMA + PMD times
 - This presentation focuses on PMA times
 - Specifically lock times

So we need faster PMA times...

Legacy Devices

- An overlooked specification
 - 2400 Bit times
- Deployed architecture capabilities
 - ~1000 Bit lock times is reasonable

A reasonable target

- Get below a total of ~1usec timing
 - Split the difference with the optical settling time
 - Target something better than 500nsec

Optimizing the current architecture for ePON

- Minor changes to the existing architecture

Advantages

- Low Hanging Fruit
- Power consumption
 - change will most likely not be significant
- Chip area change
 - Not significant. As an example:
 - Digital: counter change
 - Analog: current change in the phase detector
- Standards: Reuse the existing PMA clause
 - No need to redefine the wheel

Optimizing the current architecture for ePON (contd.)

Advantages (contd.)

- Standards (contd.)
 - No need to define a preamble
- Leverage the GigE market
 - Same SerDes could be sold to both ePON and P2P GE
- Low investment
 - Easier business case than starting from scratch
 - Current economy constraints on resources
 - Quick time to market

Target Values

- 500 Bit lock times (400 nsec)

Should we go faster

- Its not clear that we need to
 - 500 bit times... its good enough
- To go significantly faster would require going back to the drawing board
 - New architecture
 - Resource investment and design effort are significant
 - Leverage is unclear
 - Ability to leverage the 1GE market may be compromised if its more expensive than traditional P2P serdes
 - Need to define a specific preamble??
 - Do we need a special preamble for faster times (sub 100 bit times)??
 - Not clear if you can reuse the same parts for FSAN
 - Testing & Characterization costs

No free lunch

- Are there any disadvantages of optimizing the current design
 - Perhaps a tradeoff with jitter
- Reasonable lock number, like 500 bit times, will allow for easy implementation and a generous tradeoff
 - Not a show stopper

Conclusion

The take home message

- Simple and easy solution that gets us where we want to be
- Good enough and cost effective
- Quick time to market in a challenging economy