

CDR Based Extended Reach

Ryan Latchman
ryan_l@gennum.com



- **Benefits of CDR based extension**
- **Architectures**
- **Potential Reaches**
- **Next Steps**

- **CDRs enable additional budget for optics and channel**
 - Enables longer reach
- **CDRs do not impact bits (transparent)**
 - Fully compatible with 10.3125G bit rate, full rate MAC
 - Very low latency (measured in ps)
- **CDRs help with crosstalk**
 - In transmit direction, crosstalk from host & connector is eliminated
 - In receive direction, reset of jitter budget allows for robust performance in the presence of connector and host crosstalk
- **CDR based optical interface already proven in 802.3ae**
 - SR, LR, ER, Cu....
 - Enables Pluggable Module interface which is Media Independent
 - Performance, link budget determined within the module
 - Allows for future proof module / system architecture as additional PMDs arise
- **Integration with module components (laser driver, limiting amplifier) results in low cost, low power solution**

- **CDR on linecard**



- **10GBASE-S: 300m over OM3**
- **Other input from John Petrilla**
 - CDR on both Tx and Rx OM3 – 204m
 - CDR on both Tx and Rx OM4 – 248m
 - "Assuming Tx, Rx and link parameters close to those in my latest example (I've been doing some exploration to find an optimal combination of Tx and Rx attributes - so some have been traded off with others. The overall results should not change that much.), no signal degradation between the CDR and pluggable module and the following CDR characteristics: Jitter Tolerance: TJ = 0.75 UI, DJ = 0.40 UI Jitter Generation: TJ = 0.20 UI, DJ = 0.05 UI"
- **Next Steps**
 - Develop proposal for CDR based extended reach