10GigE SerDes Interface

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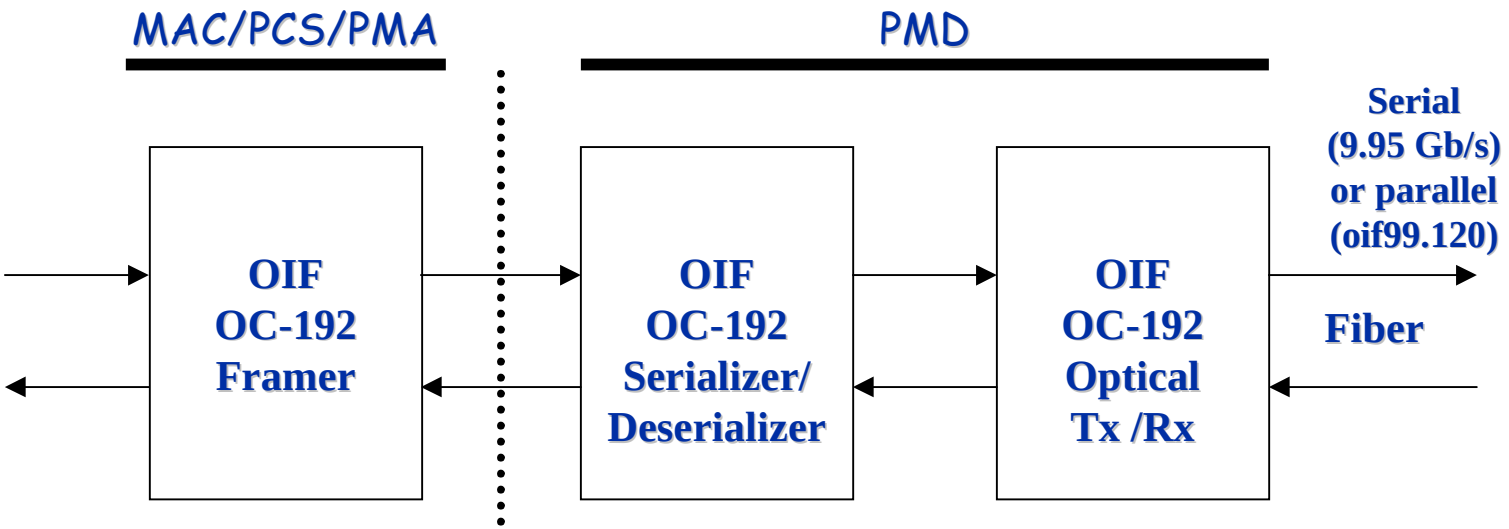
OIF's OC-192 SerDes

- WAN PHY can leverage the OC-192 SERDES interface in development at the OIF.
  - Document: OIF99.102.

- Benefits
  - Works with Serial PMDs.
    - Serial PMDs are needed in a Metro environment.
  - Works with "parallel fiber PMD".
    - Short reach WAN connectivity. OIF99.120.
  - Borrows from OC-192 development in progress.
    - Many of us here are working on this. It is not foreign.
  - Simple, low-pin count, reasonable IC technology.
    - Less aggressive IC technology than proposed at HSSG to date.

Location of Interface



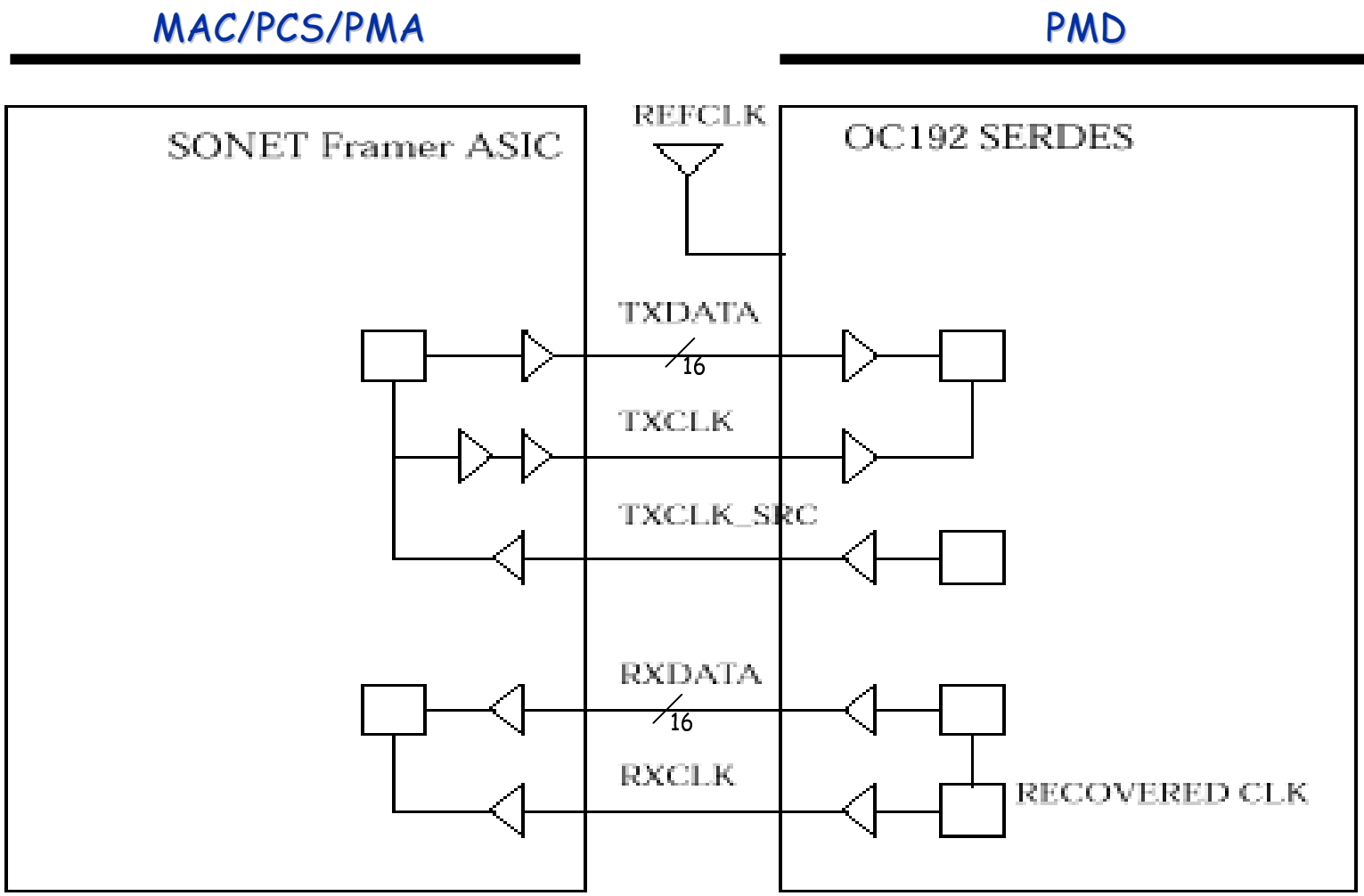
- Similar position to serial interface presented in York.
  - Electrical interface between PMA and PMD.
- OIF terms for reference.
  - Interface between SONET framers and SerDes chips.
  - Works with "parallel fiber" PMD proposed in OIF99.120.

Interface Summary

- Features
  - Unidirectional, point-to-point links.
  - Sixteen data bits each direction.
  - LVDS voltage levels at 622 Mhz.
  - Source-synchronous clocking.

- Signals (Thirty-six differential pairs)
  - Sixteen transmit data.
  - Sixteen receive data.
  - One transmit clock.
  - One transmit source clock.
  - One receive clock.
  - One reference clock.

Signals


MAC/PCS/PMA
PMD
SONET Framer ASIC
REFCLK
OC192 SERDES
TXDATA
16
TXCLK
TXCLK_SRC
RXDATA
16
RXCLK
RECOVERED CLK

OIF-192 vs. Serial Interface

- OIF OC-192 SerDes Interface

- 36 differential pairs.
- 622 Mhz clock rate.
- No encoding.
- Easy i/f to serial optics.
- Works with parallel optics*.
- Aggressive CMOS technology.
- Distance - short - inches.
- Speed
  - matches WAN PHY.
  - Too slow for "coded" PHY (LAN).
    - Needs speed up or repositioning.

- *See OIF99.120.

- Serial Interface

- 9 differential pairs (8 + clk).
- 3.125 Ghz clock rate.
- 8B/10B encoding.
- Not a "clean" i/f to serial optics.
- Works with parallel optics.
- Very aggressive CMOS technology.
- Distance - longer - ~ 20 inches.
- Speed
  - Matches schemes with 8B10B et al.
  - Faster than req'd for WAN PHY.

Summary of OIF SerDes

- For WAN PHY
  - Supports long (serial) and short distances (serial/parallel).
  - Has broad vendor support.
  - It is feasible.
  - Does not impose extra-bandwidth and serialization issues of the "York" serial interface on a serial WAN PHY.

- For LAN PHY
  - Not clear what value OIF interface has.
    - We could investigate speeding up the interface to accommodate higher bandwidth.
    - We could bind the PMA/PMD together.
    - Both are rather unlikely to occur.

Reference - OIF Project

- Project Name:
  - SERDES/Framer electrical interface for OC192
- Working group:
  - PLL
- Problem statement:
  - STS-192/STM-64 interfaces are critical to the future of the industry. Currently, there is no industry-defined electrical interface for the framer/serdes interface at lower SONET/SDH speeds. This lack of common interfaces has hurt the industry, as multiple incompatible solutions exist. No other standard bodies or forums are working on this problem for SONET/SDH.

Reference - OIF Project (cont.)

- Scope
  - This project will define the electrical interface, including pin definitions, function, timing, clocking, and signal levels. The scope does not include the footprint.
- Expected output
  - A technical document describing the electrical interface that can be used by framer, serdes, optical module, and system vendors to design and produce SONET/SDH systems.