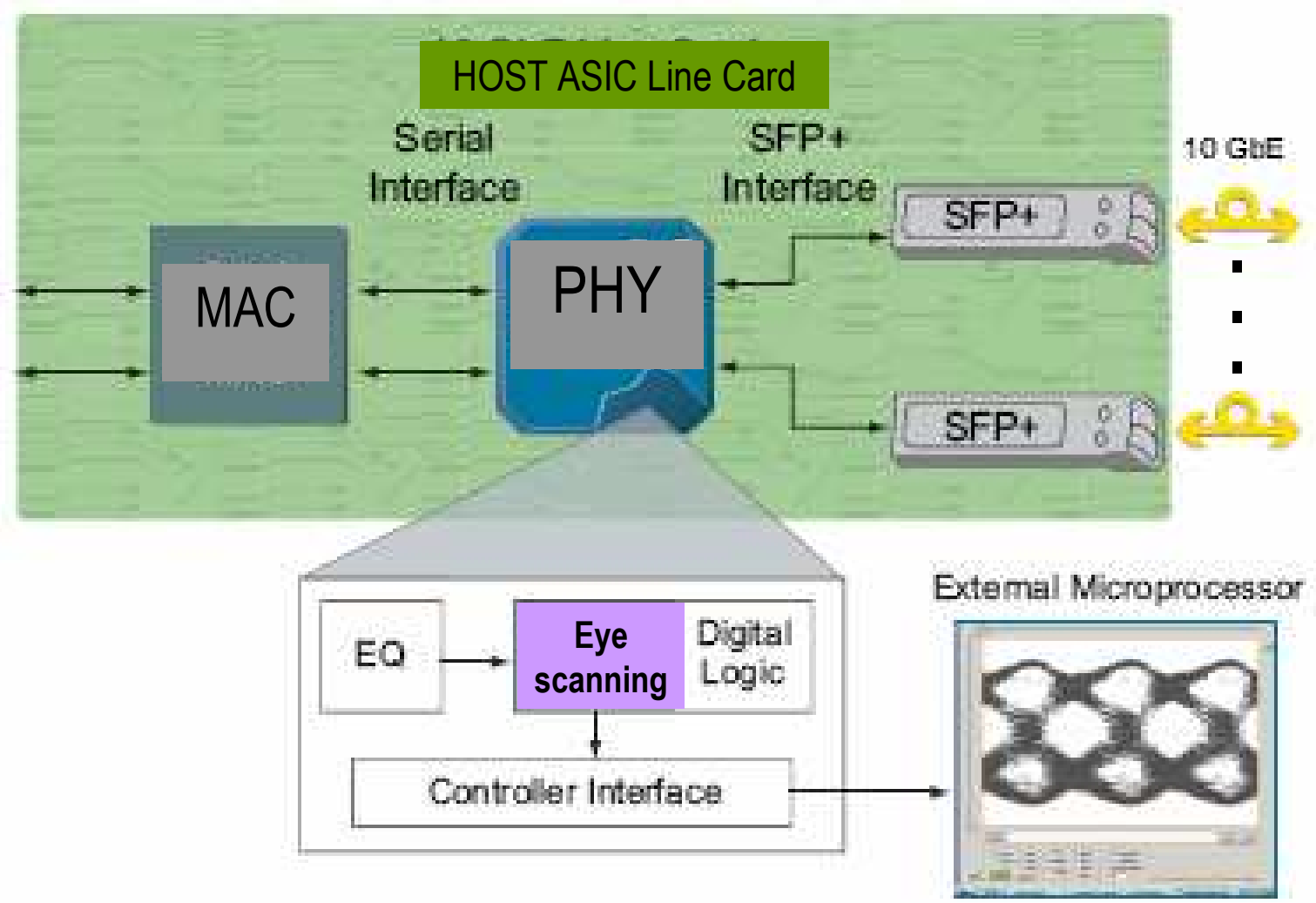
Define PMA loopback, test patterns.

- This slide is in support of comment#325-6, #328 regarding PMA loopback, test patterns etc to facilitate various IC-enabled test features, system tests.
- As indicated by nicholl_01_1108, every 10GbE PHY devices supports some kinds of loopback modes. I would recommend 802.3ba adopt (at least) PMA line loopback as mandatory.
  - This is extremely useful for some critical tests like receive SRS, link failure etc.
- PMA provide transmit test pattern generation, and receive error detection, which facilitate built-in self test (BIST) capabilities to reduce system development costs, enable manufacturing tests, and improve time to market.
- Current IC advances has enabled the implementation of much more complex test features such as embedded BER monitoring, Q-factor indicator, and waveform viewing etc.

Define PMA loopback, test patterns.

- 10GbE PHY chip normally define the follow test patterns:
  - Various PRBS patterns: PRBS7, PRBS9, PRBS23, PRBS31 etc.
  - Square waves
  - Mixed-frequency test pattern (Refer to 10GbE Clause 50.3.8.3)
  - Continuous identical digits (CID) patterns
  - User-defined patterns
- One example: current advanced ICs have built-in waveform viewing capability on CDR receive path (the so-called VScope).
  - Waveform viewing is constructed by varying the phase and offset and sampling the data.
  - Measure all relevant signal integrity parameters on every port
  - BIST feature provides BER plus Eye Diagram visualization
  - Real-time system debug become feasible within the system in deployment.

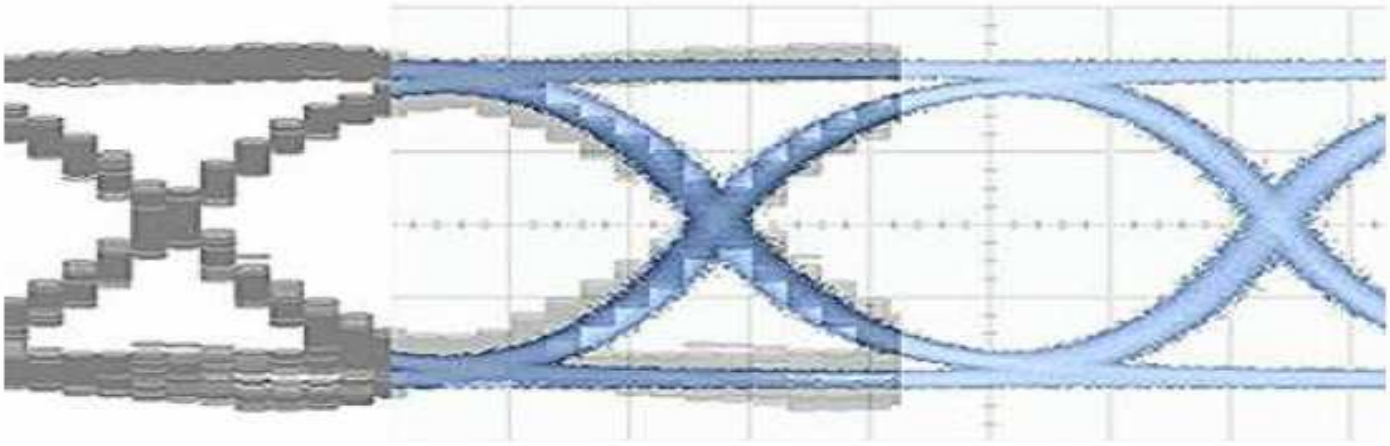
On-chip Wfm Viewing implementation



Source: http://www.vitesse.com/vscope/pdf/VScope_Optical.pdf

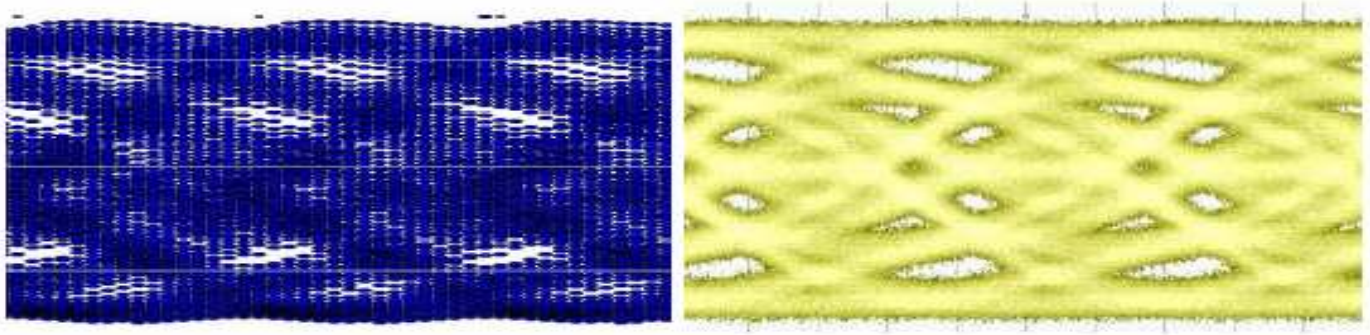
On-chip wfm viewing examples

Compared Clean eye waveform



a) On chip scope b) Sampling scope

Compared LRM distored waveform



a) On chip scope b) Sampling scope