

Optical PMD – Key Issues

Vipul Bhatt, Finisar Corporation

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Key Issues

- + Minimizing the number of Optical PMD variants
- + Adopting a link model



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Our Scope



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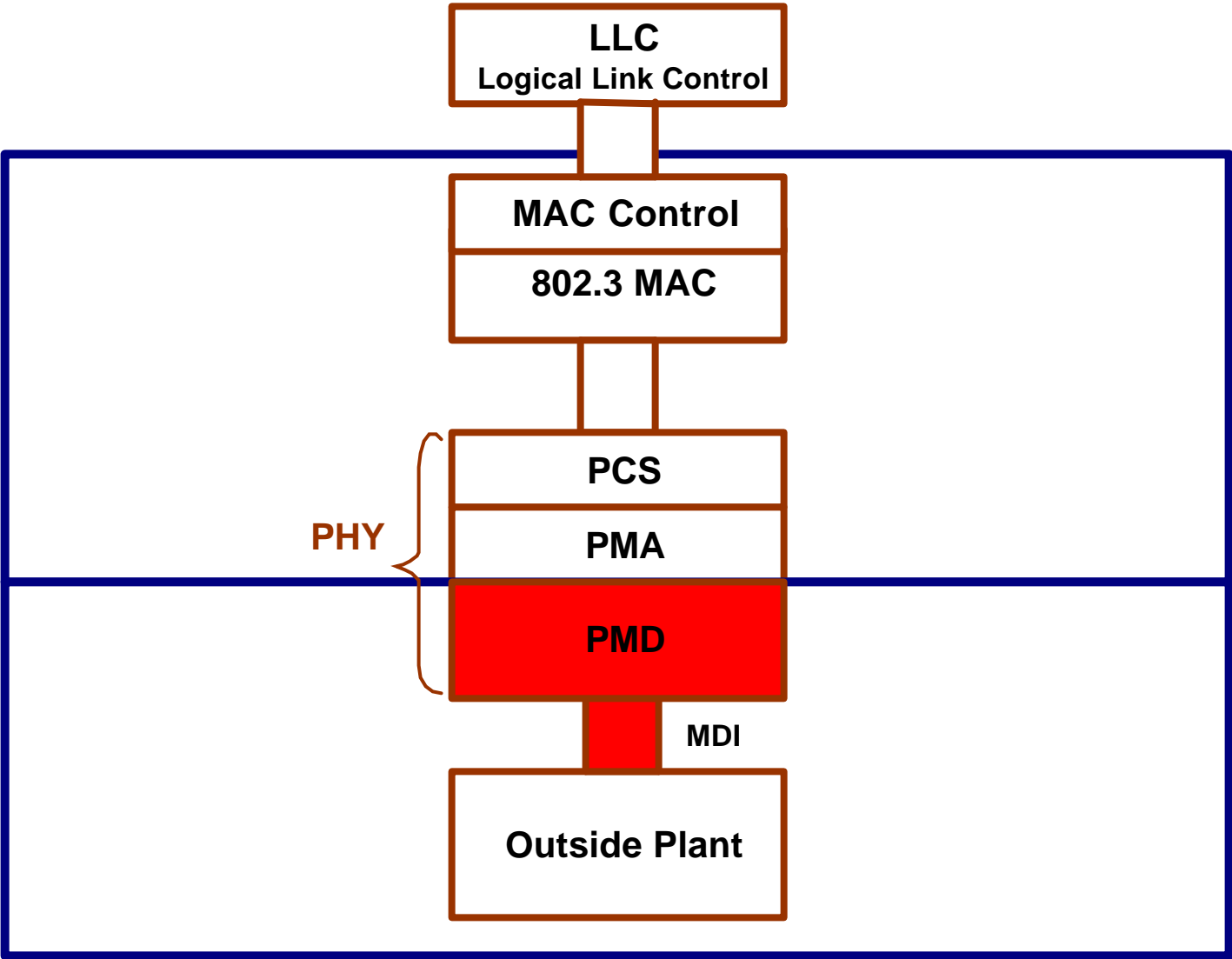
Optical PMD Sublayer

- ✦ Corresponds to a part of the Physical Layer of the OSI Model. Its function is made distinct by the type of physical medium, shielding the upper layers from that detail.
- ✦ Each distinct set of specifications is considered a PMD variant. The number of PMD variants is decided by the type of optical medium, wavelength, number of fibers, loss budget, etc.
- ✦ Our scope includes specifying MDI (Medium Dependent Interface) - an optical receptacle or a fiber pigtail.



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Minimizing the number of PMD variants



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Keeping the number of PMD variants to a minimum is important because...

- + Economies of scale help products succeed.
- + In the field, simpler is cheaper.
- + We can write the standard on time.



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Controlling “ProliphYration”

- ✚ ... is the most important guideline for defining PMD specifications.
- ✚ Will require making difficult decisions.
- ✚ Proposal and a challenge: Just THREE new Optical PMD variants, in addition to extended temperature 1000BASE-X.
- ✚ Ideal scenario: One each for P2MP head-end, P2MP subscriber-end, and P2P head-end.



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To achieve this goal, we ask, what's possible?

- ✚ Can we draw up one PMD specification that will satisfy the requirements of both P2P and P2MP at the subscriber-end?
- ✚ Is there early consensus on using a single fiber for PON?
- ✚ Is there room to write specs so as to permit multiple laser types?
- ✚ Is there early consensus on 1310/1490 wavelength plan for one-fiber links?



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Method of specifying power budget

- ✦ In 802.3z, Table 38-9 itemizes power budget, distance, channel insertion loss, penalties, and unallocated margin.
- ✦ It's an informative table, not a requirement. But it has served Ethernet well. It permits granular examination of a link budget without ambiguity.
- ✦ For P2MP, to allow multiple split/distance combinations, we face losing that luxury. We need a creative solution.
- ✦ Example of a difficulty: A splitter/coupler doesn't change dispersion related penalties, but a length of fiber does.



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Adopting a Link Model



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Choosing a link model early is important because...

- ✦ It provides an unambiguous language for technical discussions.
- ✦ It provides a yardstick for comparing the performance of various link options.
- ✦ It becomes a rigorous guide for choosing PMD specifications; permits “what if” tests.
- ✦ We will need time to refine it to suit EFM links.



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Link Model evolution

- ✦ The 802.3z link model has been refined by 802.3ae. It is the state of the art. It has a long and credible track record. URL:

http://www.ieee802.org/3/ae/public/adhoc/serial_pmd/documents/index.html

- ✦ Refinements include an OMA-based view, interaction of some penalties, revised ISI penalty expression, improved bandwidth-risetime conversion, accounting for Polarization Mode Dispersion, and more.
- ✦ This is our opportunity to piggyback on accumulated learning, and avoid proliferation of link models.



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Link Model – proposed plan

- ✦ Start with 802.3ae model, keep all the refinements applicable to EFM, and find a way to “turn off” parameters we don’t need.
- ✦ We then add features and parameters unique to EFM, but do so in such a way that they can be “turned off” by future standards.



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Link Model – refinements necessary for EFM

- ✦ Adapt it for P2MP – it should permit the cable plant splits and distances to be combined in different ways.
- ✦ Quantify new penalties resulting from single-fiber operation.
- ✦ Account for coding gain if FEC is adopted.
- ✦ Account for burst mode operation.



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Summary: decisions helpful to progress

- # We should aim for no more than three new Optical PMD variants.
- # We should adopt the 802.3ae link model as a starting point.
- # We should adopt a wavelength plan that does not interfere with the C band.
- # We should modify our objectives to focus on single fiber for P2MP.



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Discussion about motions



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