

# Why “That 3 PMD Set”

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# Steven Swanson's Question:

This is a great set of questions but I would like to broaden the scope to also include the other PMDs under consideration by 802.3ae. I understand (I think) the motivation for 1550 nm since support of extended link lengths is desired but I am wondering if others could help me understand the following, specifically as it relates to supporting a multimode cable plant:

1. What are the motivations for customer choice of 1310 WWDM?
2. What are the motivations for customer choice of 1310 Serial?
3. Are they doing this to get greater distance?
4. Are they doing this because they believe that operating a 1310 WWDM or 1310 Serial system over the installed base of MMF is less expensive than another solution over new MMF?
5. Other rationale?

# Caveat

**I am simply not smart enough to remember all the reasons we have heard expressed in various meetings over the last 16 months.**

**Still, the questions are worth trying to answer.**

**So, here goes.....**

# Background:

**The question was a revision to the question I asked John George on the reflector:**

**What are the motivations for customer choice of the new MMF?**

- 1. Are they doing this to get greater distance at gigabit speeds?**
- 2. Are they doing this to improve error rates at gigabit speeds?**
- 3. Are they doing this because the new MMF is less expensive than existing MMF?**
- 4. Are they doing this because they expect P802.3ae to adopt an 850 nm solution?**
- 5. Other rationale?**

# Why 1310 nm Serial?

## Related questions:

**1310 nm WWDM + 1550 nm Serial cover all the objectives. So, why should THIS PMD be added to the minimalist set?**

**What market does this serve that makes it more ideal?**

**Does anyone seriously believe that this PMD can ever be as cheap as 850 nm serial?**

# Why 1310 nm Serial?

- **It is FUTURE DIRECTED (vs legacy)**
  - Infrastructure of future is SMF
  - Higher speeds – sets stage for 4-lambda x 10-Gig, 802.3ad, 40 Gig Solution
  - < Risk than WWDM
  - < Cost than WWDM (over time)
  - > Reliability than WWDM over time
- **It is a great fit for the WAN PHY**
  - Great way to connect to the SONET infrastructure
- **Connections in the MAN and RAN will be a very significant market for 10GbE.**
  - Grossly underestimated thus far?

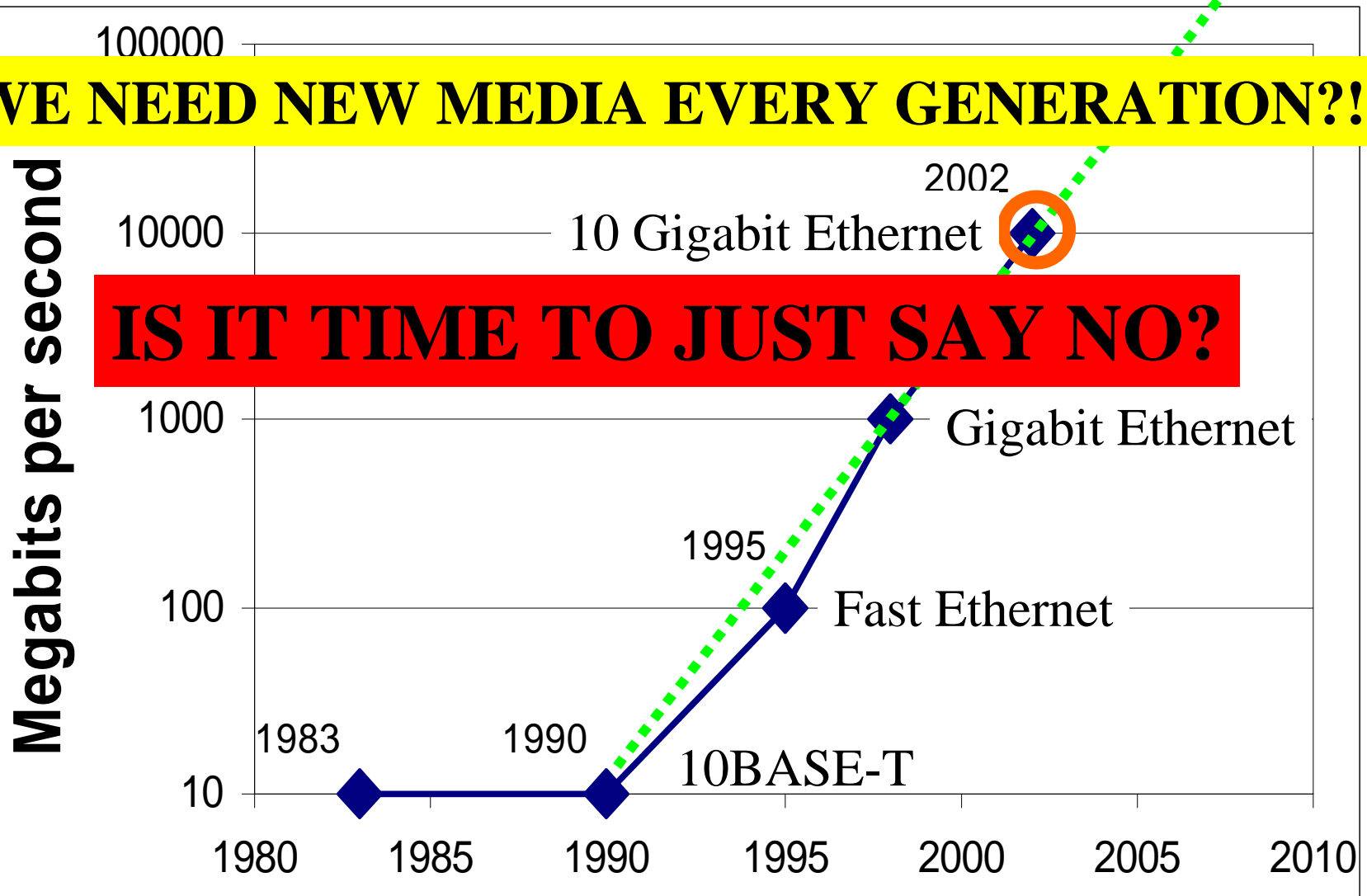
# But, it costs more than 850!

## Well, that depends. Let's look at the fiber:

- **SMF costs less (50% with high fiber count; less yet compared to HBW MMF). SMF is supported by more vendors -> more competition (broad...)**
- **Cost of connectorization dominated by fiber preparation, not piece parts. It is true that connections are higher, but not that much**
- **SMF has virtual, infinite life**
- **SMF, including installation, can be amortized over life of building (\$ / N-generations of 802.3)**
- **Meanwhile, MMF IS BECOMING AN ITEM ON THE BILL OF MATERIAL, not an infrastructure decision. Media churn is becoming a bad habit!**

...and by the way, what is the 20 yr plan for infrastructure?

**DO WE NEED NEW MEDIA EVERY GENERATION?!**



**IS IT TIME TO JUST SAY NO?**



# AND...

**I don't know about you, but I am getting calls from confused fiber installers and contractors about new installations:**

- **Informed that 802.3ae is adopting new HBW MMF for 10GbE**
  - “Support 300 m over **new** MMF”
  - Can't understand why the answer isn't SMF
  - If required, will pull hybrid MMF / SMF

# OK, but the XCVR is cheaper

**For GbE and FC, SW, MMF has been lower cost than LW, SMF**

- **Extremely high volume, low cost, CD lasers (vs. high cost, telecom, LW lasers)**
- **Plastic housings (vs stainless with ceramic ferrules for SMF)**
- **Plastic optics (vs glass lenses for SMF)**

# But,

- **Plastics might not work with <30 micron tolerances required by new HBW MMF**
  - Already have poor repeatability and side pull in MMF applications
- **Silicon optical benches change the rules**
- **There is virtually no cost delta on Rx side**
- **While fiber costs are fairly static, XCVR will drop over time**

AND...

**LW VCSELS ARE around the corner...**

- **Expect lower voltage (2.5 Volt?)**
- **Expect lower current**
- **Potential for lower  $dl/dT$  -> lower EMI**
- **Potential for higher speed than 850**

**Yes, these are more challenging than 850 nm VCSELS.**

**But, given the benefits, shouldn't we encourage the development?**

**With equivalent volumes and appropriate investment in manufacturing infrastructure, there is no reason to believe that 1310 transceivers require any significant premium over 850 nm transceivers.**

OK, so let's assume that the 1310 nm Serial PMD is a good idea for a second.

If we adopt this, we really don't need the 1310 nm WWDM PMD, do we?

***AU CONTRARIETI...***

The 1310 nm WWDM PMD is...

**The only PMD proposal with the potential of working over the vast majority of existing infrastructure**

**The only PMD that will work to 300 meters over installed 62.5 micron fiber**

**While this is not a specific objective of P802.3ae,**

**IT IS EXTREMELY DESIREABLE!**

...and remember,

**with the 1310 nm Serial PMD,**

**the 1310 WWDM PMD sets  
the stage for a 4 lambda x  
10-Gigabit, 802.3ad, 40 Gig  
Solution**



Oh, and by the way,

**Yes, I think that we do “believe that operating a 1310 WWDM... system over the installed base of MMF is less expensive than another solution over new MMF.”**

**And no, I don't remember seeing any hard, factual data that would lead me to think otherwise.**

“...are they doing this to get greater distance?”

**Well sure.**

Think how **cool** it is to say that there is **virtually no limitation on a building infrastructure** any more!

**Heresy, right?**

## Other rationale?

- **High speed 850 nm VCSELs are not in production; are not qualified (?)**
- **Why should we be dependent on timely completion of 2.2.1 if we don't need to be?**
- **Confident of CDRH for laser safety, but just another schedule risk**
- **The TIA is not bound by the 5 criteria**
- **Fiber availability of new HBW MMF is unknowable (changes to design, yields, changes to mfg processes, capacity, etc.)**
- **Don't want to fragment the market and artificially limit competition**

## From the May Minutes...

- **Howard spoke in favor of just two PMD's because this is the least amount of work and we'd get the standard done much quicker.**
- **Volume will drive cost, the more choices we have the lower the chance of getting high volume on any one.**
- **Another systems vendor said less is best but not as low as 2.**

## From the May Minutes...

- **The customers are smart, they don't care about technology....These customers don't like confusion; in fact they want one solution that works every where.**
- **We will not get the focus in the market place if we have to talk to the market about 12 [port types].**
- **Ten options is way too many for me as a systems provider, my customers will throw me out of their office.**

## From the May Minutes...

- **The group is not focused on the hard decision**
- **David Law a systems vendor from 3Com said less is good**
- **Time to market is very key [confusion will delay]**
- **The problem with allowing 5 options is that you have to supporting all five long term.**

# Several Comments Supporting Stephen Haddock's Proposal

**Pick one from each row**

## **3 -- Best Solution.**

**Painful number of PCS-PMD combinations, but justifiable based on providing an optimized solution for three distinct application spaces.**

## **>3 -- Chaos.**

**... but easy for the committee. (Better be hot-pluggable SFF !!)**

# Summary

**The 1310 WWDM and the 1310 / 1550  
Serial PMDs are all we need**

- **Meets the objectives with minimal  
customer confusion**

**Help the transceiver  
executives get the message  
so they can do what is  
right! Vote 3**



*5 is Jive*

**3 sets us FREE**