Information to Reach Consensus on the Number of PMDs *or* "*My role as Don Quixote*"

P802.3ae Interim

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History Lessons

- ◆ **100BASE-TX, -T2 and, -T4**
  - Targeted at essentially the same space — 100m UTP
  - Only one garnered mainstream acceptance
  - ∴ *We should only develop one PMD per space*

- ◆ **1 Gig had *one and only one* PMD targeted at each application space**
  - 1000BASE-SX — MMF
  - 1000BASE-LX — SMF
  - 1000BASE-CX — Coax
  - 1000BASE-T — UTP

Desire to reduce number of PMDs

◆ **Following motion previously passed:**

The P802.3ae TF shall reduce the number of distinct PMDs (independent of PMA,PCS and other upper layers) being worked on to no more than 7 by the end of the July, 2000 P802.3ae Task Force meeting. The expectation is there will be fewer than 7 by Working Group Ballot. Application of the P802.3ae objectives shall be the primary filter.

◆ **Following motion failed by 1 vote:**

The P802.3ae TF shall reduce the number of distinct PMDs (independent of PMA,PCS and other upper layers) being worked on to no more than 7 by the end of the July, 2000 P802.3ae Task Force meeting and no more than 4 prior to Working Group Ballot. Application of the P802.3ae objectives shall be the primary filter.

Critical PAR Criteria

- ◆ Broad Market Potential
  - ▪ Broad set(s) of applications
  - ▪ **Multiple vendors, multiple users**
  - ▪ Balanced cost, LAN Vs. attached stations

- ◆ Technical Feasibility
  - ▪ Demonstrated feasibility; reports - - working models
  - ▪ Proven technology, reasonable testing
  - ▪ Confidence in reliability

- ◆ Economic Feasibility
  - ▪ Cost factors known, reliable data
  - ▪ Reasonable cost for performance expected
  - ▪ Total Installation costs considered

PMD Evaluation Criteria (York)

- Rate ability to meet broadest set of application & distance/fiber
- Relative cost comparison - short/long term
- Time to standardization, Time to market
- Qualitative Reliability (e.g. MTBF, etc.)
- Undetected frame error rate at the MAC client IF
- Working prototype of PHY available by completion of Sponsor Ballot (meets MDI specs)
- Multiple vendor supply available by completion of Sponsor Ballot

Relevant 802.3ae Objectives

- Distance objectives cover three application spaces
- Short reach
  - At least 100 m over installed MMF
  - At least 300 m over MMF
- Intermediate reach
  - At least 2 km over SMF
  - At least 10 km over SMF
- Long haul
  - At least 40 km over SMF
- We should strive for minimum number of PMDs that satisfy the objectives

Conflicting Desires

# of PMDs	Equip Mfgs	PMD Vendors
≤ 3	Acceptable	Unacceptable
4	Borderline Acceptable	Borderline Acceptable
5	Borderline Unacceptable	Acceptable
= 6	Unacceptable	???

Observations

- Five PMDs have received the most attention
  - 850nm & 1310 4λ WWDM
  - 850nm, 1310nm & 1550nm Serial

- Twelve PMD combinations satisfy distance objectives
  - Three 2-PMD sets (personally exciting, but no hope of passing!)
  - Five 3-PMD sets
  - Three 4-PMD sets
  - One 5-PMD set

- Both 850nm solutions require new High Bandwidth Fiber to meet 300m objective

- Supporting LAN & WAN speeds may turn # of PMDs into twice as many PMD specs

2-PMD Solution Sets

Dist.	Set A	Set B	Set C
100 m inst. MMF	1310 4λ WWDM	1310 4λ WWDM	850* 4λ WWDM
300 m MMF			
2 km SMF			1310 Serial
10 km SMF			
40 km SMF	1310 Serial	1550 Serial	

* Requires new High Bandwidth Fiber for 300m

(3-5)-PMD Sets

Dist.	Set 1 & 1a (3 PMDs)		Set 2 (3 PMDs)	Set 3 (3 PMDs)	Set 4 (3 PMDs)		Set 5 (4 PMDs)		Set 6 (4 PMDs)		Set 7 (4 PMDs)		Set 8 (5 PMDs)	
100 m inst. MMF	850* 4λ WWDM	1310 4λ WWDM	1310 4λ WWDM	850* 4λ WWDM	850* 4λ WWDM		850* 4λ WWDM		1310 4λ WWDM		850* 4λ WWDM	1310 4λ WWDM	850* 4λ WWDM	1310 4λ WWDM
300 m MMF	850* 4λ WWDM	1310 4λ WWDM	1310 4λ WWDM	850* 4λ WWDM	850* Serial	850* 4λ WWDM	850* Serial	850* 4λ WWDM	850* Serial	1310 4λ WWDM	850* 4λ WWDM	1310 4λ WWDM	850* Serial	1310 4λ WWDM
2 km SMF	1310 4λ WWDM	1310 4λ WWDM	1310 4λ WWDM	1310 Serial	1310 Serial		1310 Serial		1310 Serial		1310 4λ WWDM		1310 Serial	1310 4λ WWDM
10 km SMF	1310 4λ WWDM	1310 Serial	1310 Serial	1310 Serial	1310 Serial		1310 Serial		1310 Serial		1310 4λ WWDM		1310 Serial	1310 4λ WWDM
40 km SMF	1310 OR 1550 Serial	1550 Serial	1550 Serial	1550 Serial	1310 Serial		1550 Serial	1310 Serial	1550 Serial		1550 Serial	1310 Serial	1550 Serial	

* Requires new High Bandwidth Fiber for 300m