

# Meeting MMF 5-Criteria

Andre Szczepanek

# Supporters

- Jonathan King, Finisar

# Overview

- 5-Criteria overview
  - Objectives need to meet them !
- Meeting 5-criteria with a Retimed MMF solution
  - Focusing on re-timer requirements
- Conclusions

# 5 Criteria

## ■ Broad Market Potential

- Broad sets of applicability.
- Multiple vendors and numerous users.
- Balanced costs (LAN versus attached stations).

## ■ Compatibility

- Compatibility with IEEE Std 802.3
- Conformance with the IEEE Std 802.3 MAC
- Managed object definitions compatible with SNMP

## ■ Distinct Identity

- Substantially different from other IEEE 802.3 specifications/solutions.
- One unique solution per problem (not two solutions to a problem).
- Easy for the document reader to select the relevant specification.

## ■ Technical Feasibility

- Demonstrated system feasibility.
- Proven technology, reasonable testing.
- Confidence in reliability

## ■ Economic Feasibility

- Known cost factors, reliable data.
- Reasonable cost for performance.
- Consideration of installation costs.

## ■ We need to focus on Technical and Economic feasibility of an MMF solution. We don't need to decide which solution.

- If they can be shown "Broad Market potential" will follow
- "Compatibility" and "Distinct Identity" are givens

# Technical feasibility of a re-timed MMF solution

- CMOS & SiGe retimers are available for the 10dB VSR channel
  - These devices are uni-directional (not customized for Rx & Tx)
  - Therefore the simple equalization used by VSR is already available to the Optical channels for no additional cost/power
    - 10dB CTLE (adaptive on some implementations)
    - TXFIR (on some implementations)
- Simple Rx Eq & Tx Eq per *king\_02\_0112\_NG100GOPTX* and *petrilla\_01\_0112\_NG100GOPTX* is already provided by some VSR re-timers

# Economic feasibility of a re-timed MMF solution

- A CFP4 100GBASE-SR10 solution will require a 4:10 gearbox
  - CMOS gearboxes are available that are  $\sim 1.5x$  the power of a VSR retimer pair.
- The retimer/simple eq power for SR4 is  $\sim 2/3$  that of the SR10 gearbox
- Power is a proxy for complexity

# Conclusions

- Simple Rx & TX equalization is already provided by VSR re-timers
- The power of the 4:4 (VSR) re-timers required on a SR4 module is  $\sim 2/3$  the power of the 4:10 gearbox required on an SR10 CFP4 module
- Re-timers for a retimed SR4 MMF interface are Economically and Technically feasible