

400G PMDs for broad market potential

Tom Palkert

Luxtera

What reaches should be considered?

- 3-7m for intra rack
- 30-100m for inter rack
- 500m for data center
- 2km for telecom central office
- 10km for long reach
- 40km for extended reach

What are the requirements for broad market potential?

- Low power at all reaches (can't be 4x faster and 4x power)
- High density/small form factor for shorter reaches (Data center)
- 'Reasonable' form factor size for longer reaches (CFP size?)

Infrastructure

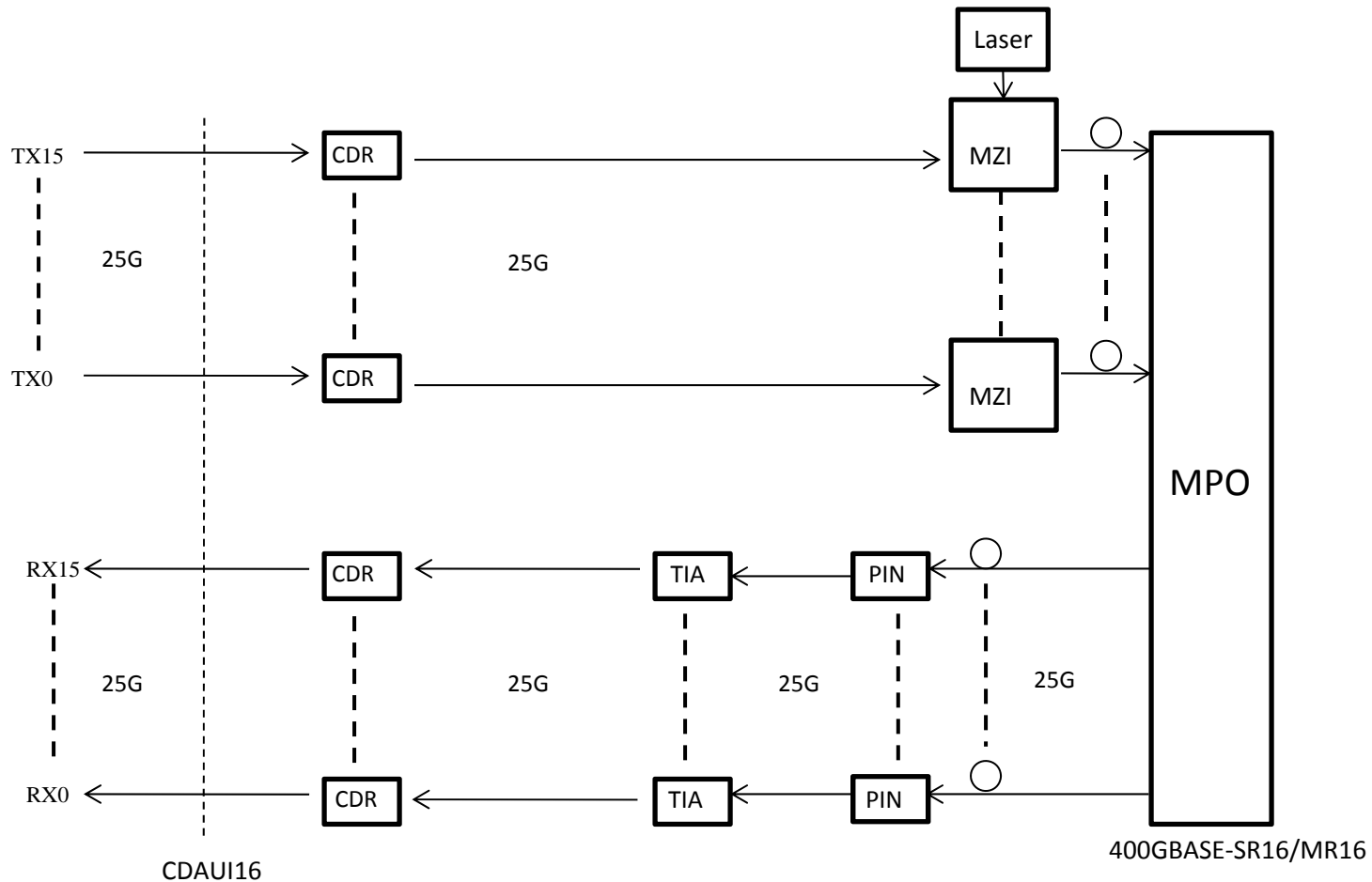
- Duplex SMF
- Parallel fiber MMF
- Copper cable
- Parallel fiber SMF

Possible Module options

- 16x25G-PSM16 – CDFP module
 - Lowest power in short term, fastest time to market
 - Satisfies short reach requirements for data center
 - Supports copper, MMF and SMF
- 4x PAM4-PSM4 – CFP2 or CDFP module
 - Potential for Lowest power in long term
 - Lower fiber cost than PSM16
 - SMF only?
- 4x PAM4-WDM4 – CFP size module
 - Needed for long reaches (reduced fiber cost)
 - SMF only

PSM16 block diagram

Uses existing 25G electrical I/F
Requires 32 fiber ribbon



CR16 copper module

- No FEC in module
- CDAUI16 electrical I/F for retimed cables
- CR16 electrical I/F for passive copper cables

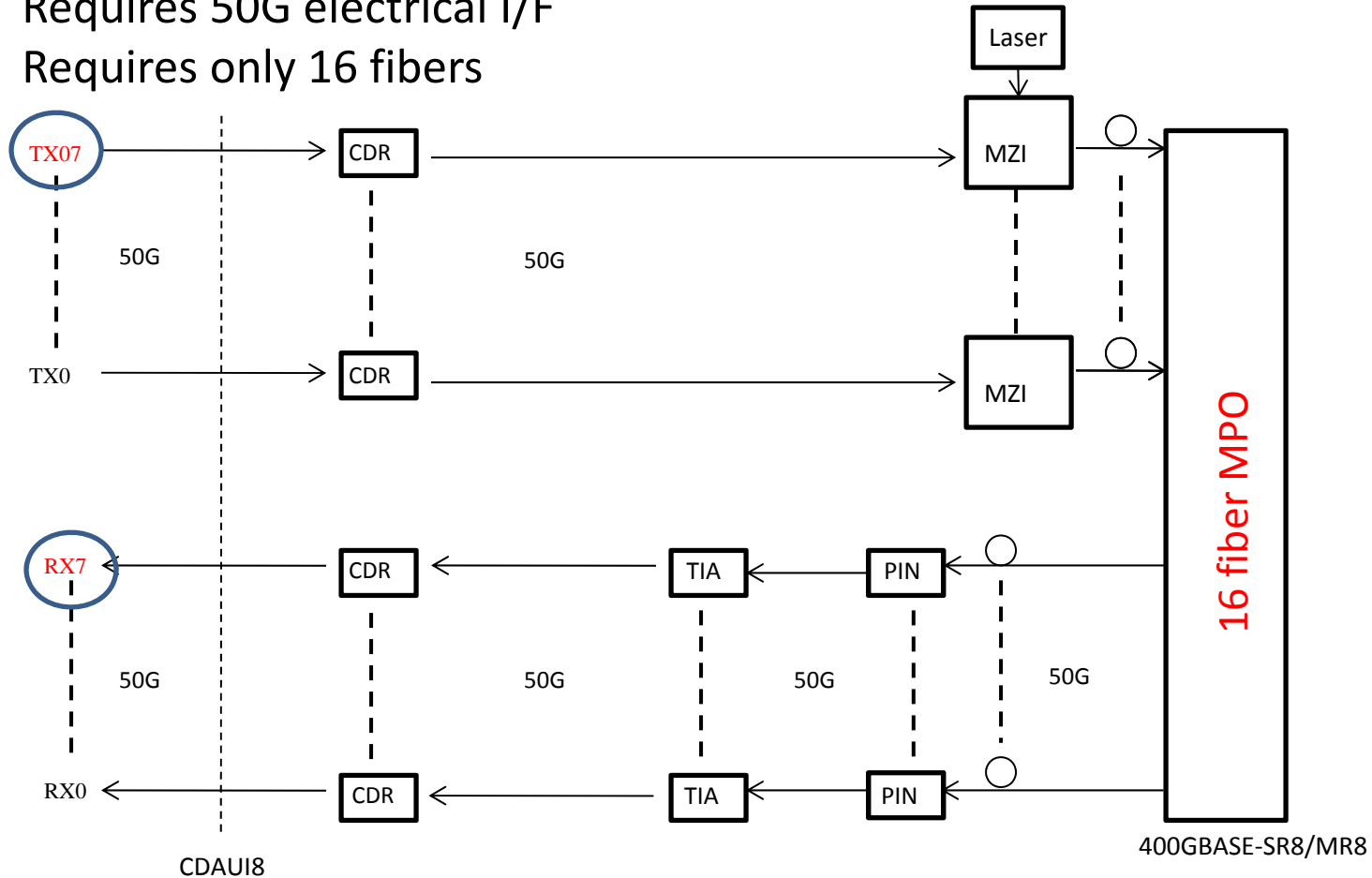


Forward path for PSM16 = PSM8

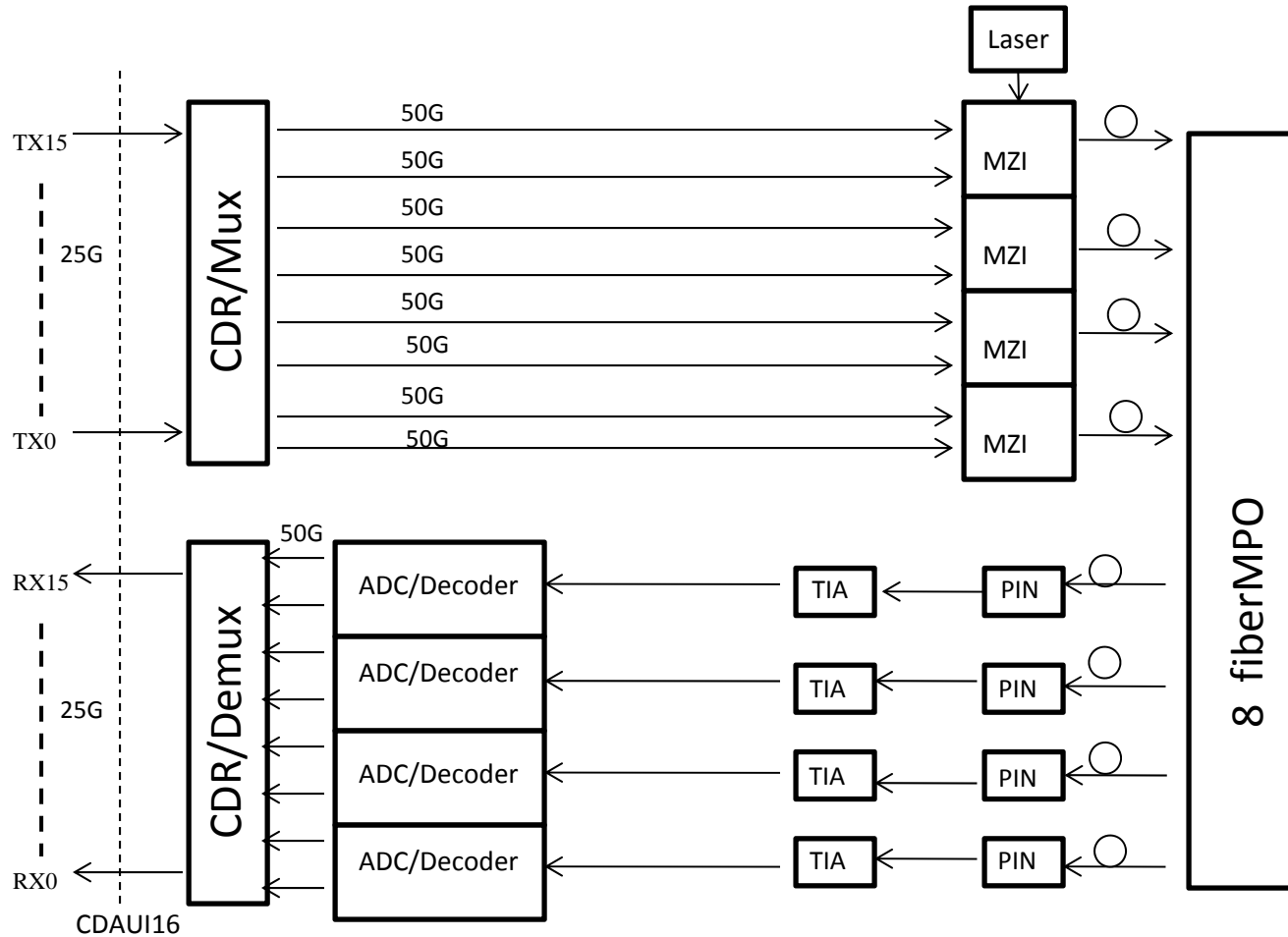
Narrower electrical and optical interface

Requires 50G electrical I/F

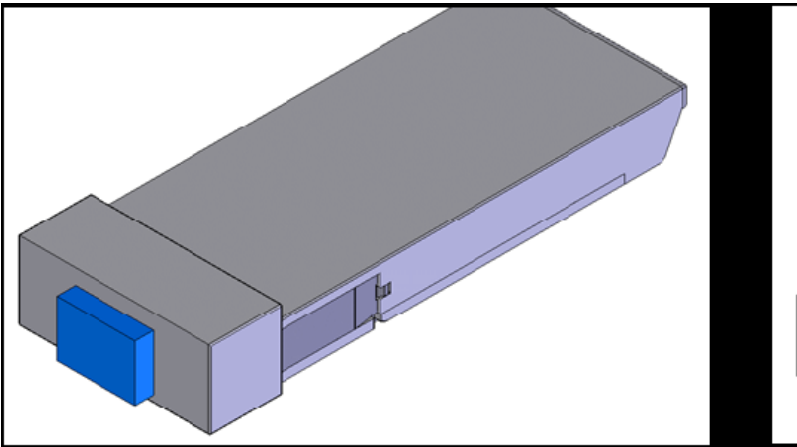
Requires only 16 fibers



PSM4 (4x PAM4)



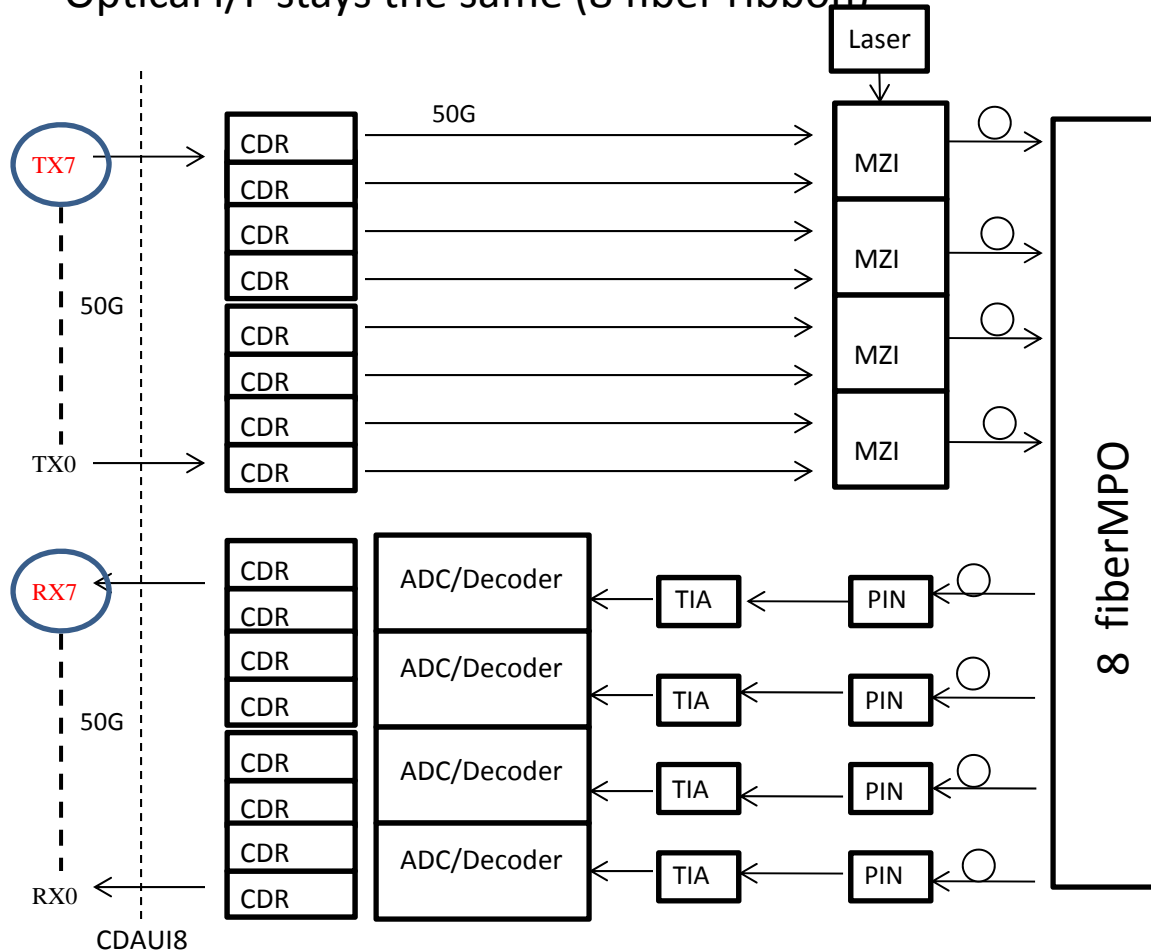
PSM4 (4xPAM4) optical module options



Module option selection would depend on power and density of design

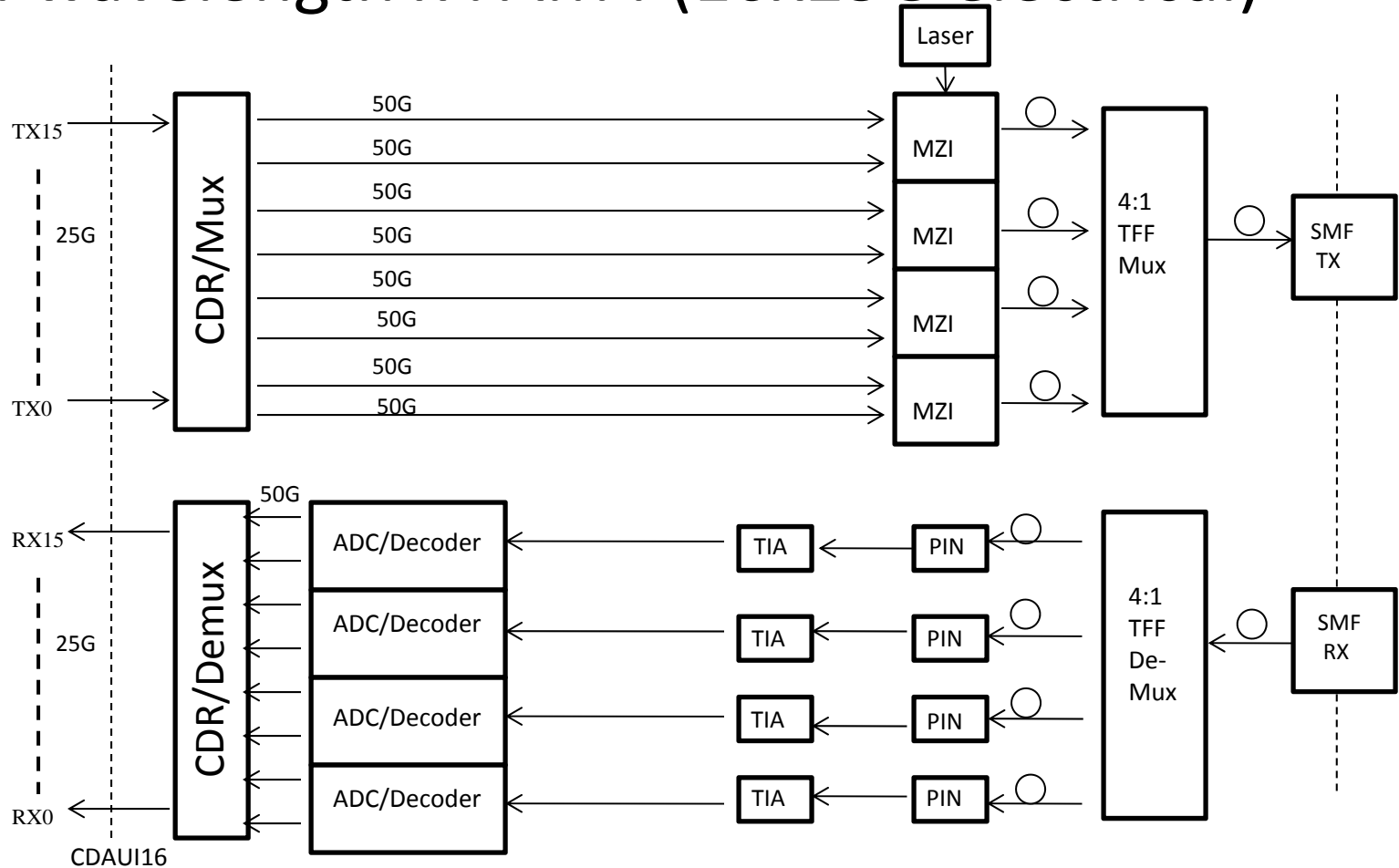
Forward path for PSM4 (4x PAM4)

Narrower electrical I/F enables higher density modules
Optical I/F stays the same (8 fiber ribbon)

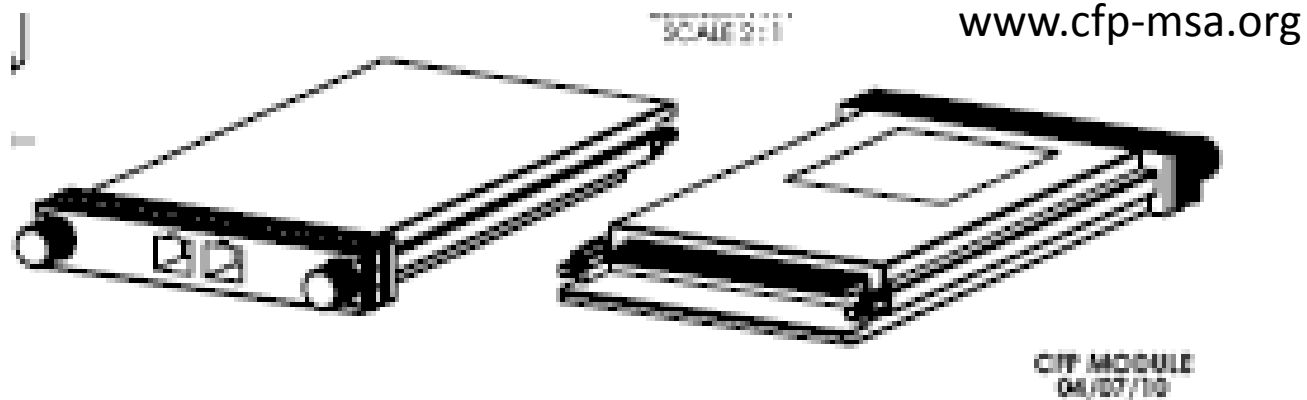


4 wavelength x PAM4

- 4 wavelength x PAM4 (16x25G electrical)



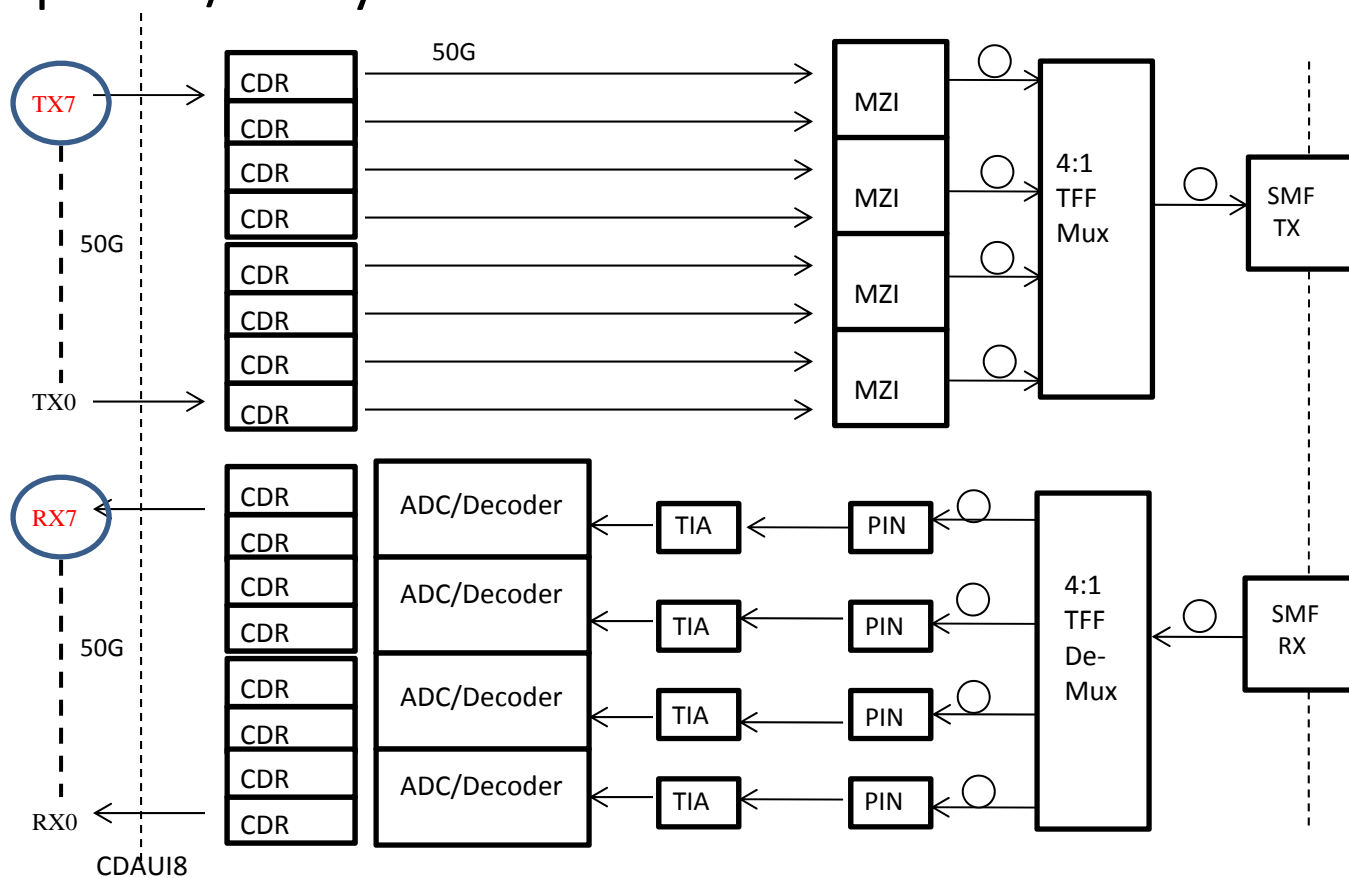
4 wavelength x PAM4 module



Similar size to 100G CFP module will probably be required

Forward path for 4 wavelength x PAM4

- 4 wavelength x PAM4 (8x50G electrical)
- Optical I/F stays the same



Summary

- Broad Market Potential requires:
 - Support for Multiple reaches
 - Minimum number of form factors
 - Forward path to higher density and lower power
- Key objectives:
 - Low Power
 - High density
 - Time to market
 - Forward compatibility