

SYSTIMAX®
SOLUTIONS

Cost analysis of 40G & 100G MMF variants, an update of kolesar_01_0507

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Purpose

- **Cost compare various 40G MMF PMD implementations using LAG and Fat Pipe scenarios**
 - 40G LAG: 4 x XFP and 4 x SFP+
 - 40G Fat Pipe: 4 x 10G lanes in QSFP
- **Compare above 40G costs to 100G MMF PMD**
 - 100G Fat Pipe: 10 x 10G in SNAP12
- **Include volume & yield effects in comparison**
- **Incorporate additional input since May**

Comparison approach

- **PMD costs use XFP cost factors as base**
 - Each row is an independent cost element; values are not relative to costs of other rows
 - The “weighted average” row combines the elements
 - Weights derived from discussions on and off reflector
- **Host real estate comparisons use QSFP footprint as base**
- **Cabling cost factors are with respect to each other, not relative to PMD cost factors**
 - Costs derived from CommScope/SYSTIMAX models

Cost Factors of various 40G and 100G MMF PMDs

Component	40G LAG 4xXFP	40G LAG 4xSFP+	40G FatPipe QSFP	100G FatPipe 10x10G	Comment / assumption
CDR	4x	0x	0x	0x	Electrical EQ eliminates CDR
Driver, TOSA	4x	4x	5x	8x	"8" from jewell_01_0107 (10k pcs/yr), "5": log(n) array yield
ROSA, TIA	4x	4x	5x	8x	
PCB	4x	2x	2x	2x	Crosstalk complicates QSFP
Pkg, Receptacle	4x	3x	3x	6x	LC vs MPO
Test	4x	4x	4x	11x	Optical tests dominate
Total PMD	4.0x	2.0x	2.4x	4.3x	Weighted average
Host real estate	6.6x	3.0x	1x	1.6x	Footprint area on host PCB
Host panel width	4.7x	3.3x	1x	1.9x	Includes pitch between devices
Cabling	1x	1x	1x	2x	Array cabling in data centers

SFP+ and QSFP provide the lowest cost for 40G, and a factor of ~2 savings compared to 100G

QSFP consumes 1/3 of the real estate of SFP+, and 1/2 the panel width of 100G

QSFP requires 1/4 of the number of patch cords of other 40G PMDs, and cabling cost for all 40G variants is 1/2 that of 100G

Backup

From kolesar_01_0507

Intrinsic* Cost Factors of various 40G and 100G MMF PMDs

Component	40G 4xXFP	40G 4xSFP+	40G QSFP	100G 10x10G	Comment / assumption
CDR	4x	0x	0x	0x	< 300m eliminates CDR
Driver, TOSA	4x	4x	3x	8x	Array savings
ROSA, TIA	4x	4x	3x	8x	Array savings
PCB	4x	4x	2x	2x	Xtalk complicates QSFP
Pkg, Recept	4x	4x	2x	4x	LC/SC vs MPO
Test	4x	4x	3x	5x	Fewer logic ifcs on array
Total PMD	4x	3x	2x	4x	Weighted average
Host real estate	8x	4x	1x	2x	
Cabling	1x	1x	1x	2x	Array cabling in Data Ctrs

QSFP provides the lowest cost alternative for both PMD and host real estate for 40G, and a factor of 2 savings on both compared to 100G

4xSFP+ provides a lower cost PMD vs 4xXFP or 10x10G, but 2x more real estate than 10x10G

Cabling for all 40G variants is 1/2 that of 100G

*PMD manufacturing volume effects not included

From jewell_01_0107

PICOLIGHT[™]

100m 10x10Gig Transceiver Costs (Initial 10,000 parts/year volumes)

Component	10GBASE-SR XENPAK	10x10Gig	Comments
SERDES	1x	0x	N/A for 100G
Driver IC + TOSA	1x	8x	Driver integrated w/ TOSA Arrayed 10G chips
ROSA	1x	8x	Arrayed 10G chips
PCBA/Mech	1x	2x	
Test	1x	5x	Increased test efficiency required
TOTAL	1x	4x	Weighted average at initial volumes