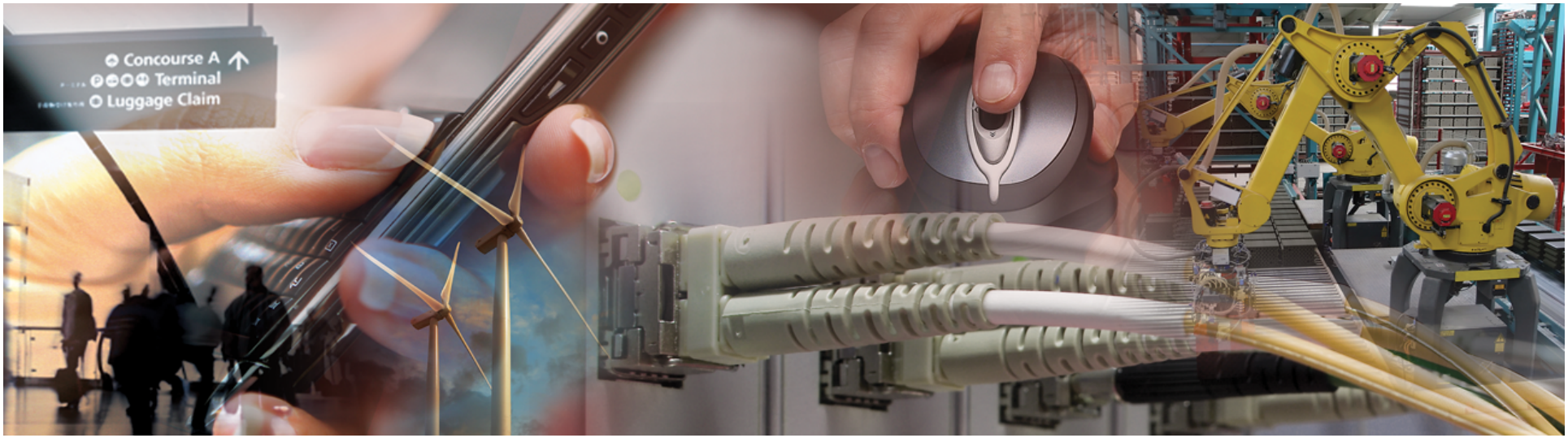
25G PHY types



Jeff Slavick – Avago

Supporters

- Kent Lusted

Goals

- **Satisfy objectives – 100m MMF, 3m & 5m Cu Cable, 35dB BP**
- **Meet CSD**
  - Ie. Broad Market Potential & Economic Feasibility
- **Plug-n-Play - interoperability**
- **Minimize options**

PHY Types for 25G

- **25G Optics**
  - RS-FEC required to close link budget
  - RS-FEC required to get >0m of fiber
  - No AN
- **25G Copper**
  - AN can be run – enables negotiation of the data format
  - RS-FEC required to close maximum link budget
  - noFEC can meet FLR requirements for distances >0m
  - noFEC reduces latency by 200+ns
  - noFEC is effectively free
  - BASE-R FEC can help extend reach/BER at 20% area cost

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25G Uses

- **Switch / Router chips will likely support 25G-SR**
  - So cost of mandatory 25G-CR RS-FEC implementation is 0 for them
  - Roughly a 1-4% die growth to add 25GE support
- **PHY Chips**
  - Cost of RS-FEC could be viewed as high
    - 45k gate Clause 49
    - 400k gate Clause 108
    - 9x increase in gate count to support RS-FEC from noFEC
  - Increase in Silicon cost could be viewed as acceptable

Recommendation for 25G PHY Types

- **25G-SR**
  - Mandatory RS-FEC usage
- **25G-CR/25G-KR**
  - Mandatory RS-FEC implementation
  - AN usage of RS-FEC
    - Default AN bit to request RS-FEC usage
    - Allows noFEC operation in “engineered systems”
  - Remove BASE-R FEC as option for CR/KR

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Recommendation for 25G PHY Types

Table 105-2

	73	78	106	107	108	109	110	111	112
25G-CR	M	O	M	M	M	M	M		
25G-KR	M	O	M	M	M	M		M	
25G-SR		O	M	M	M	M			M

Table 73-4

A9	25G-BASE-CR 25G-BASE-KR
A10-A23	Reserved
A24	F2

74.6.5

a) F0 – BASE-R FEC ability
b) F1 – BASE-R FEC is requested
c) F2 – RS-FEC is requested

otherwise RS-FEC function shall be enabled on the link if 25G-BASE-CR/25G-BASE-KR is the HCD and at least one device requests 25G RS-FEC on the F2 bit; otherwise FEC shall not be enabled.

Alternate solution for 25G PHY Types

- **25G-SR**
  - Mandatory RS-FEC usage
- **25G-CR/25G-KR**
  - Mandatory RS-FEC implementation
  - AN usage of FEC
    - Default AN bit to request RS-FEC usage
    - Allows noFEC operation in “engineered systems”
  - Optional BASE-R FEC (like all current PHYs)

Alternate for 25G PHY Types

Table 105-2

	73	74	78	106	107	108	109	110	111	112
25G-CR	M	O	O	M	M	M	M	M		
25G-KR	M	O	O	M	M	M	M		M	
25G-SR			O	M	M	M	M			M

Table 73-4

A9	25G-BASE-CR 25G-BASE-KR
A10-A22	Reserved
A23	F3
A24	F2

74.6.5

a) F0 – BASE-R FEC ability
b) F1 – 10/40/100G BASE-R FEC is requested
c) F2 – 25G BASE-R FEC is requested
d) F3 – 25G RS-FEC is requested

If 25G & a F3 request use RS-FEC;
If 25G & both F0 & a F2 request use BASE-R FEC;
If Legacy & both F0 & a F1 request use BASE-R FEC;
Don't use FEC