

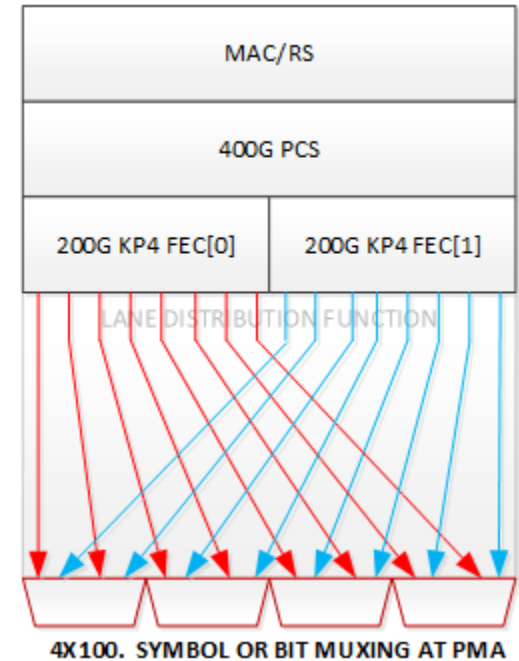
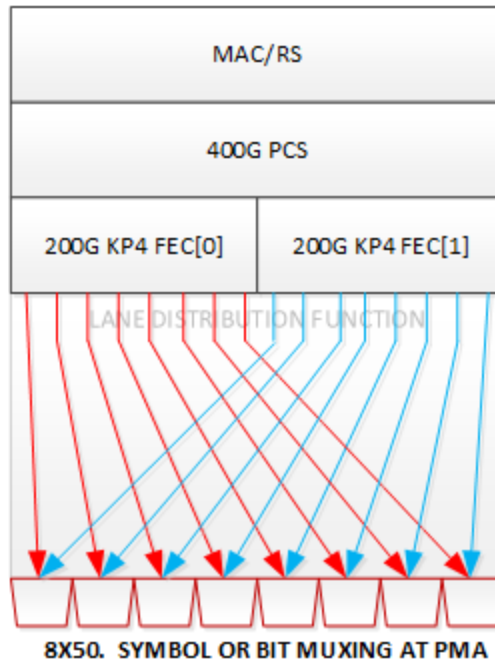
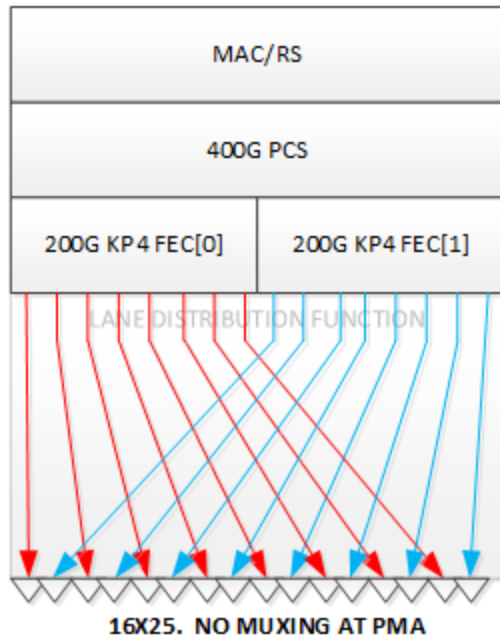
# 2X200G FEC ARCHITECTURE AND MUXING

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IEEE 802.3bs, Task force, Sep. 2015

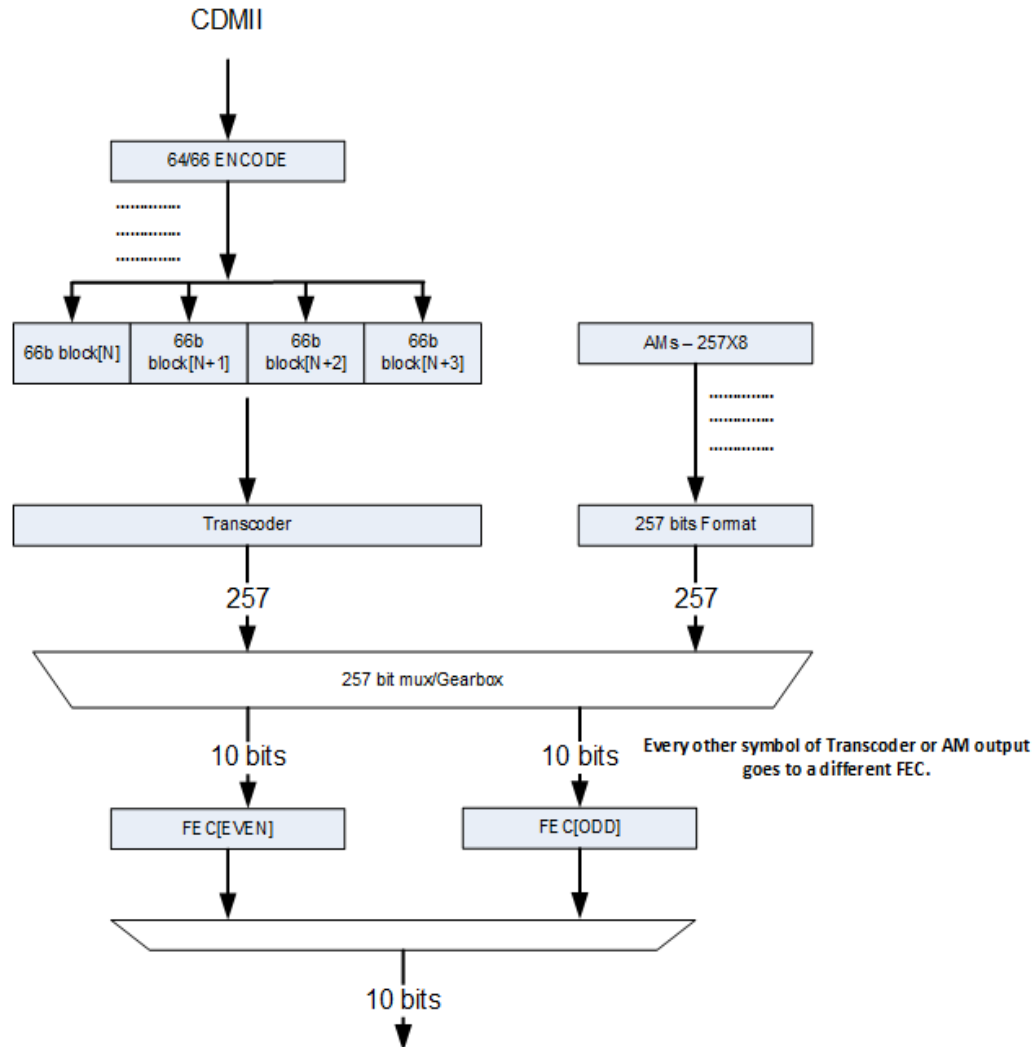
## HIGH LEVEL FEC ARCHITECTURE

- **Two FECs with Code Word Interleaving**
  - 16 PCS LANES
  - 8 FEC LANES PER FEC
- **Supports 16x25, 8x50, 4x100**
- **Symbol or Bit Muxing TBD**



## TRANSMIT FEC ARCHITECTURE

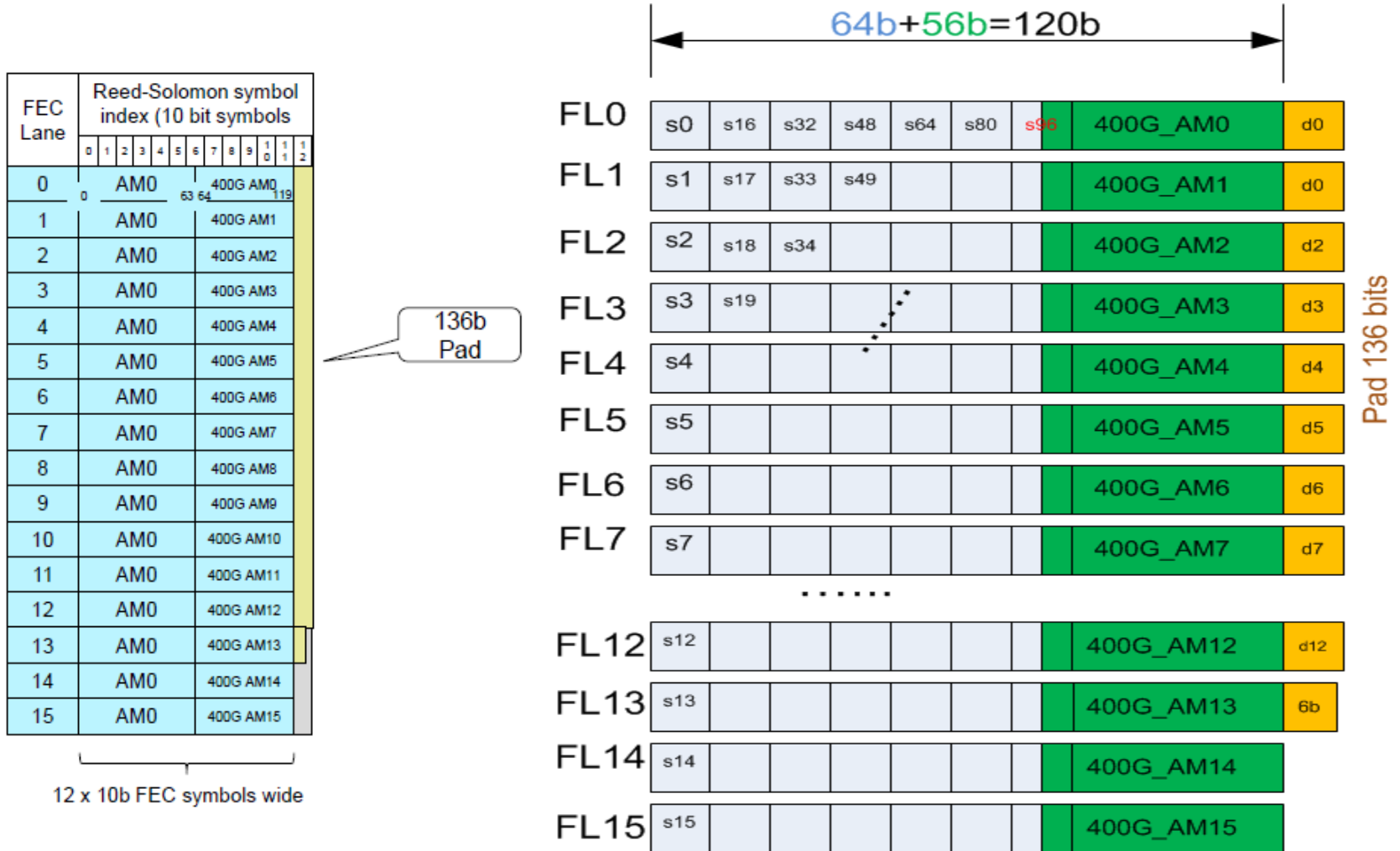
- FEC input interleaving on 10 bit symbol granularity.



# 400G PORT USING 2X200G FEC ARCHITECTURE

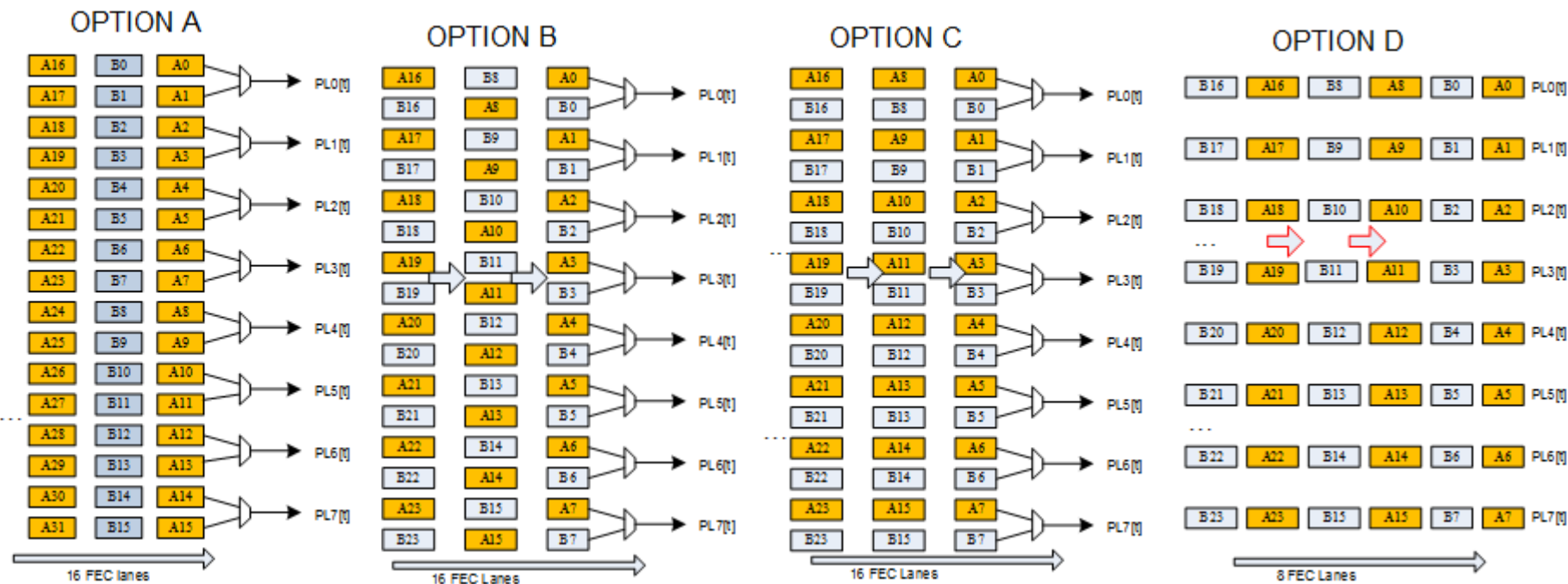
## AM Data Arrangement

- Predetermined (8x257 bits) AM data are ordered one symbol (10 bits) per lane.



## BIT MUXING FORMATS w/ 2 way code interleaving

- **OPTIONS TO MAINTAIN CODE WORD INTERLEAVING IN 8X50 AS WELL AS 16X25**
- A = Anslow option 8,  
[www.ieee802.org/3/bs/public/adhoc/logic/aug25\\_15/anslow\\_01\\_0815\\_logic.pdf](http://www.ieee802.org/3/bs/public/adhoc/logic/aug25_15/anslow_01_0815_logic.pdf)
- B = proposed by Z. Wang, checkerboard functions like pre-skewed version of 'A'
- C = proposed by E. Baden, each FEC word has 8 vs. 16 stripes
- D = Wertheim, re-proposed by W. Bliss, the bit-muxing is not illustrated here  
[www.ieee802.org/3/bs/public/15\\_03/wertheim\\_3bs\\_01a\\_0315.pdf](http://www.ieee802.org/3/bs/public/15_03/wertheim_3bs_01a_0315.pdf)



### PAM-4 SHORT 'BURST' MODEL

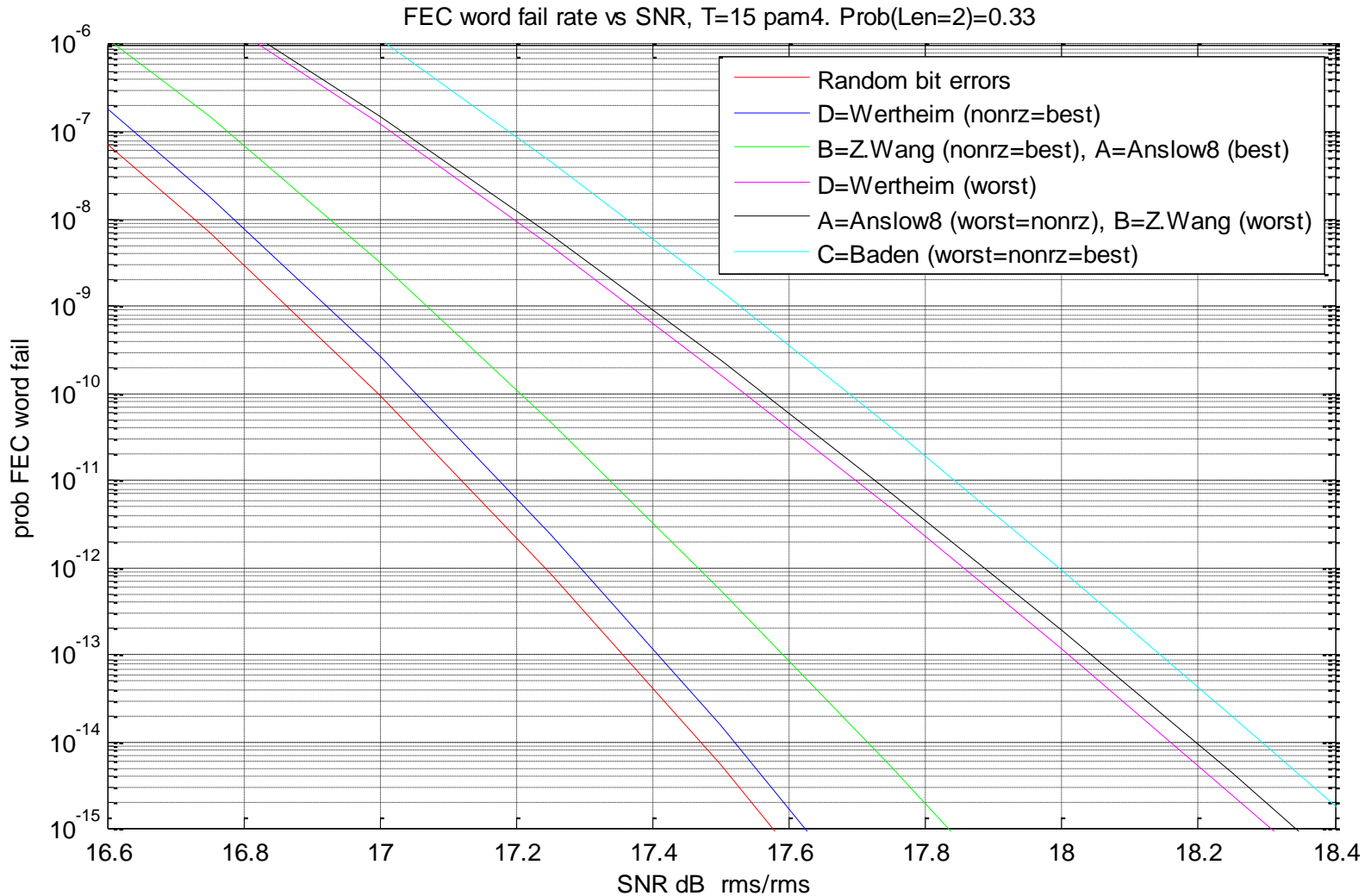
- **Motivated by performance of many HIGH IL and HIGH X-TALK channels**
  - Not with textbook DFE type architectures
- **Simplified to create a realistic operating condition that is complimentary to the long bursts previously studied**
- **Random occurring Error Events**
  - Probability  $2/3$  of single symbol error event
  - Probability  $1/3$  of event with two adjacent symbol errors
  - One bit in error in each erred PAM-4 symbol, with random probability for either bit

### RESULTS for PAM-4 SHORT BURSTS

- 'nonrz' means when no 16x25G segments are present
  - 'worst' means when 16x25G segment skews make worst performance
  - 'best' means when 16x25G segment skews make best performance
  - Option C performs identical over skews, but is always worse than all others
  - Option B performs the same as A=Anslow 8, except it performs best with 'nonrz'
- 
- **Recommend adopting OPTION B:**
    - OPTION B also performs identically to A = Anslow 8 for the 16x25G segments, and also identically on the previous 'long bursts'

# 400G PORT USING 2X200G FEC ARCHITECTURE

## FEC WORD FAILURE RATIO VS. SNR





**THANK YOU!**