



# IEEE 802.3ba: MAC Response Times

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(supporting comments # 274 & 275)

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# Status Quo



- Response Time @ 10G
  - MAC , RS and MAC-Control layer has a delay limit of 16 Pause Quanta
- Response Time @ 40G
  - MAC , RS and MAC-Control layer has a delay limit of 20 Pause Quanta

- **Delay Limitations do not scale with the line rate**

- To support 40G rates, it is unlikely that the clock frequency is increased 4x when compared to 10G
- More common implementation choice is to increase the data-bus width
- Increased data-bus width implies higher delay in the MAC/RS/MAC-Control layer
  - Example:
    - Doubling data-bus width of an IEEE 802.3 compliant 10G MAC would imply that a 40G MAC must be allowed at least 32 Pause Quanta of MAC/RS/MAC-Control delay
    - IEEE 802.3ba/D2.1 allows for ONLY 20 Pause Quanta

# Recommendation



- Increase MAC/RS/MAC-Control delay limit for 40G from 20 to 32 Pause Quanta

# Buffering Impact

- Increasing the MAC/RS/MAC-Control Delay increases the overall headroom requirements during PFC/PAUSE operation
- Calculation of the increased buffer size
  - Assumptions
    - Bit rate: 40 Gbps
    - PHY delay: 32 PQ (FEC turned off)
    - Cable length: 10 km
    - Speed of light:  $2 \times 10^8 \text{ ms}^{-1}$  (0.66c)
  - Status Quo Buffering requirement: 7916.5 PQ
    - MAC /RS/MAC-Control delay: 40 PQ (0.5%)
    - Other delays: 7876.5 PQ (99.5%)
  - Buffering requirement with Proposed Change: 7940.5 PQ
    - MAC/RS/MAC-Control delay: 64 PQ (0.8%%)
    - Other delays: 7876.5 PQ (99.2%)
  - Percentage Increase in the buffering requirement: 0.3%
- Buffering impact is marginal