

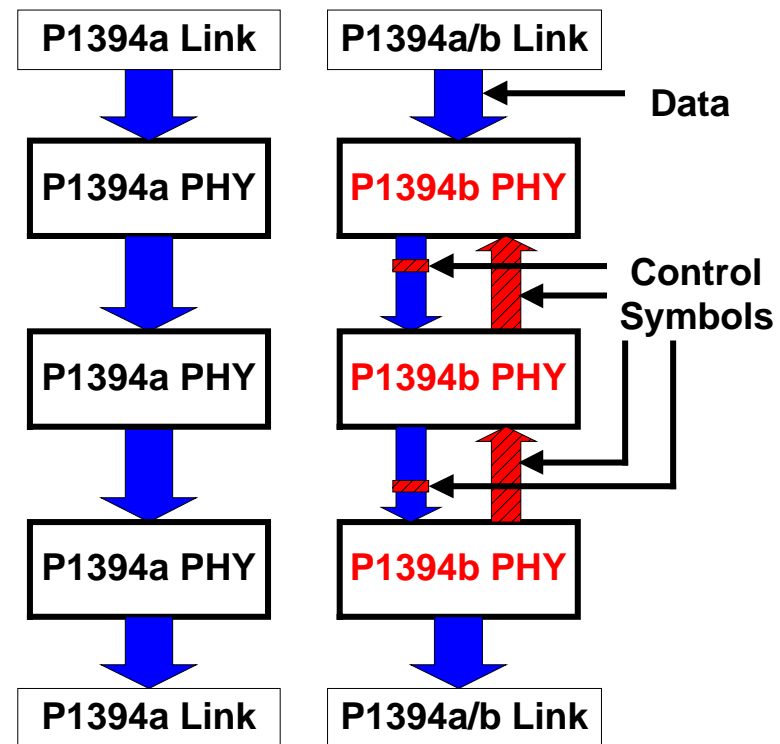
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# P1394b Protocol Acceleration

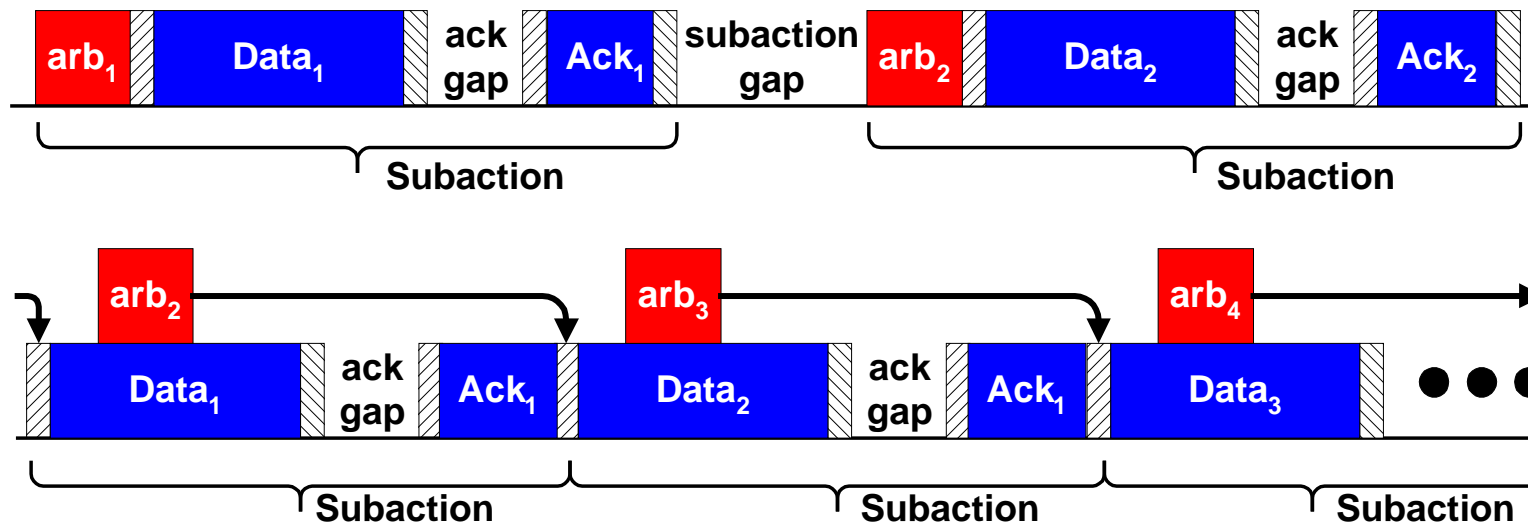
January 1998

# Underlying P1394b Changes

- Full Duplex PHY
  - » PHY/Link interface is still half duplex
  - » Path against data flow is always available
- Encoded Signaling
  - » Data and line states are represented by encoded symbols
  - » Hamming distance 2 between data and control symbols
  - » Hamming distance 6 between selected control symbols
- Control Symbols may be sent during data transfers
  - » On free path against data flow
  - » Embedded within data flow



# P1394b Arbitration



- Arbitration is done during data transmission
  - » Request is sent to root
  - » Grant is sent to winning node
- Next granted device concatenates to previous subaction
  - » gaps between subactions are eliminated
  - » arbitration is hidden

# Open Issues

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- Operation when P1394A devices are attached
  - » P1394a devices still need to see gaps
  - » P1394a devices still must send isochronous traffic every 125uS
  - » P1394b device should be root
  - » Pipelined arbitration can not cross P1394a boundaries
- Operation with P1394A Links
  - » request cancellation
- Error Handling
  - » Lost arbitration signals
- Efficiency Strategies
  - » Grant first request
  - » Grant own link or child request

# Issues Continued

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- Encoding details
  - » to be handled with bport group
- Timing
  - » Determining the end of the Fairness Interval and notifying all nodes
  - » Ensuring request reaches root in time
  - » Ensuring grant reaches next device in time

# Timing

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- Does PHY send requests any time?
- Fairness interval determination
  - » root detects and sends token
    - new interval if no requests during max propagation time + arb\_delay
    - sends arb reset token instead of grant?
      - Elasticity buffer size increase if sending both
  - » all nodes detect new interval
    - new interval if no grant or deny during subaction\_gap + arb\_delay
      - less efficient

# Timing Continued

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- How do we give legacy devices gaps
  - » legacy devices need arb reset gaps and some subaction gaps
  - » B originated traffic then A originated traffic
    - give gaps to A devices during B traffic
    - some higher level protocols may break if B must always precede A
  - » OR act mostly as an A bus when A devices exist
    - still do immediate arbitration among B nodes
    - observe 'A' style arb reset gaps

# PHY/Link Considerations

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- Must work with A links?
  - » Isoch is okay
    - request is made and not cancelled
- Link knows whether talking to 'A' or 'B' PHY?
  - » 'B' PHY - 'B' Link
    - requests are not cancelled
  - » 'B' PHY - A Link
    - PHY operates as 'A' PHY?
    - OR PHY sends request immediately
      - tracks Links view of cancellation
      - for cancelled request
        - » does not give grant to link
        - » sends null packet on behalf of link