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# **P1394B Arbitration Acceleration**

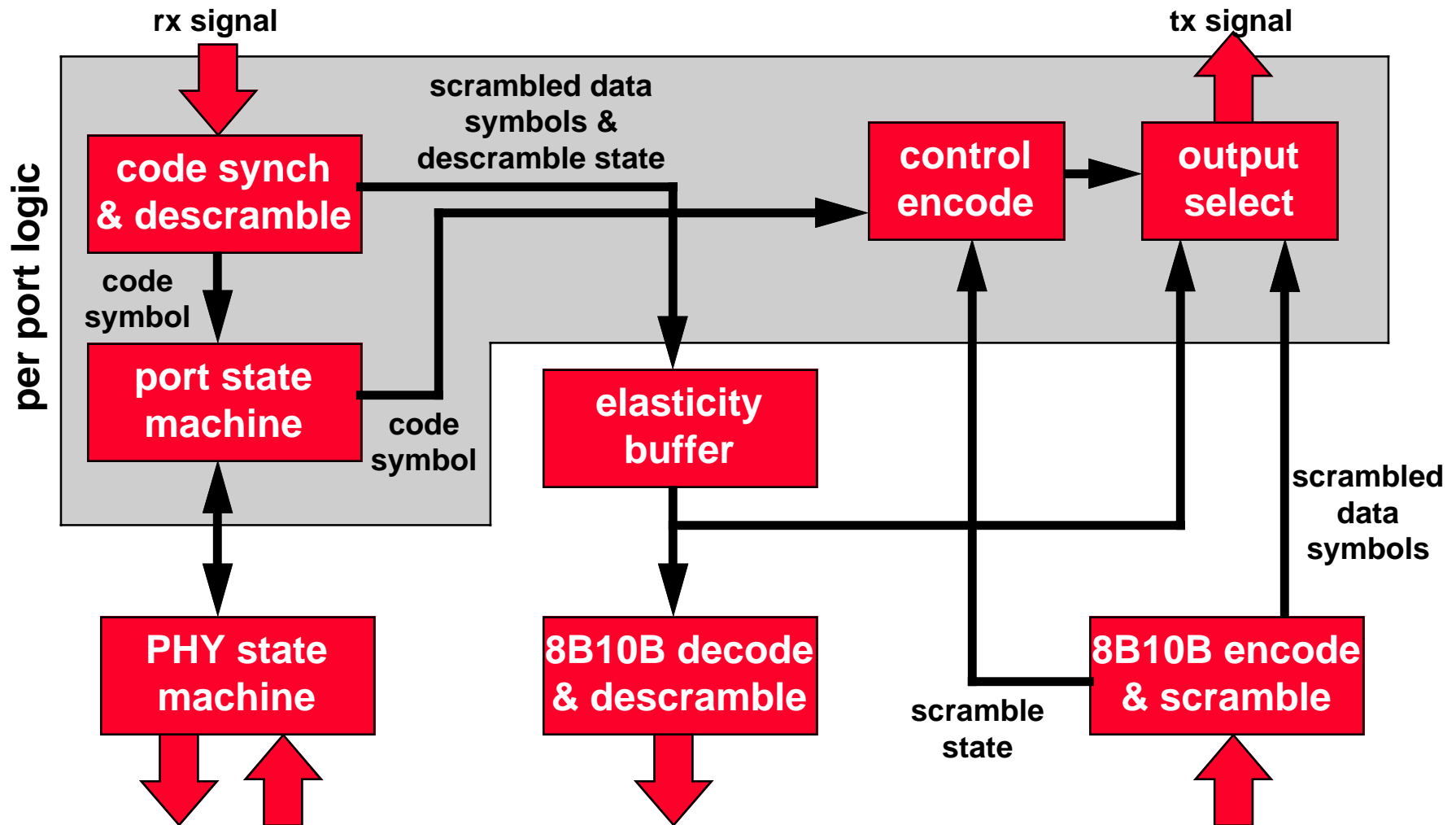
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# Assumptions

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- ◆ **link continues to be half duplex**
  - link cannot send packet (or ack) while receiving packet (or ack)
- ◆ **PHY is full duplex, but only for control**
  - P1394b is different from p1394a because the PHY is always full duplex, even when sending data
- ◆ **relatively robust control signalling**
  - codes for control are not easily confused with each other or with data

# PHY model



# Outline of proposal

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- ◆ **when link or child makes arb request, PHY passes request immediately up to parent**
  - **p1394a and 1394-1995 links make arb requests even while receiving a packet**
  - **p1394b PHY will propagate the request even while packet data is present**
  - **once a request is sent to the parent, all child/link requests are ignored until the next packet is sent**
- ◆ **root sends grant to the first child that sends a request**
- ◆ **PHY propagates grant to requesting child or attached link**
  - **architectural/performance question: should we give priority to attached link?**

# Request propagation

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- ◆ if data is coming from parent, request propagates on unused signal going back to parent
- ◆ if data is going to parent, request is embedded within that data stream
  - requires that PHY elasticity buffer have extra capacity to allow insertion of extra symbol

# Grant propagation

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- ◆ **if data is coming from child, grant propagates on unused signal going back to child**
- ◆ **if data is going to child, request is embedded within that data stream**
  - **requires that PHY elasticity buffer have extra capacity to allow insertion of extra symbol**
  - **request and grant go in opposite directions, so only need a single extra symbol in elasticity buffer**

# Error conditions

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- ◆ **lost request or grant**
  - request times out, retry
  - timeout value same as subaction gap
- ◆ **others??**

# Attached legacy devices

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- ◆ **p1394b should be “root cloud”**
- ◆ **child ports attached to p1394a nodes can send idle signals while S800+ traffic is active**
  - **can accept request signal and forward request to root**
  - **wait to propagate a “grant” to p1394a child until S800+ traffic is over**
  - **what is p1394a request timeout?**

# Coding issues

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- ◆ **request and grant codes can be identical**
  - direction of signal determines meaning
- ◆ **must be neutral disparity**
  - may be embedded within 8B10B data traffic