High-speed communication with FPD-Link

TI Precision Labs - FPD-Link

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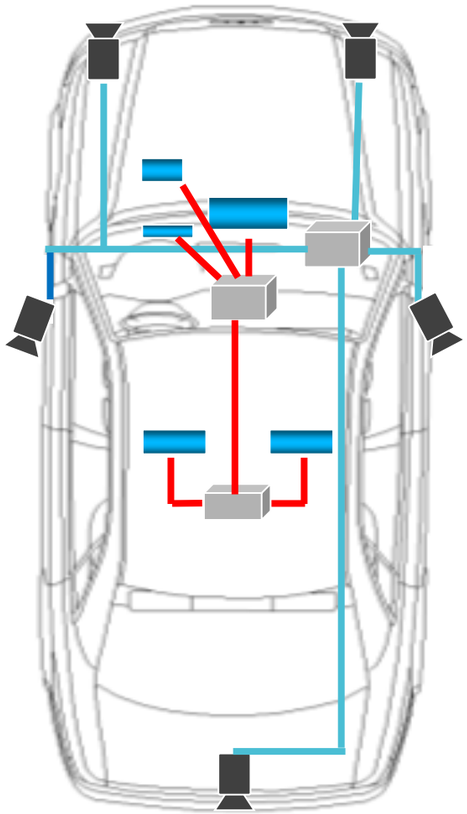
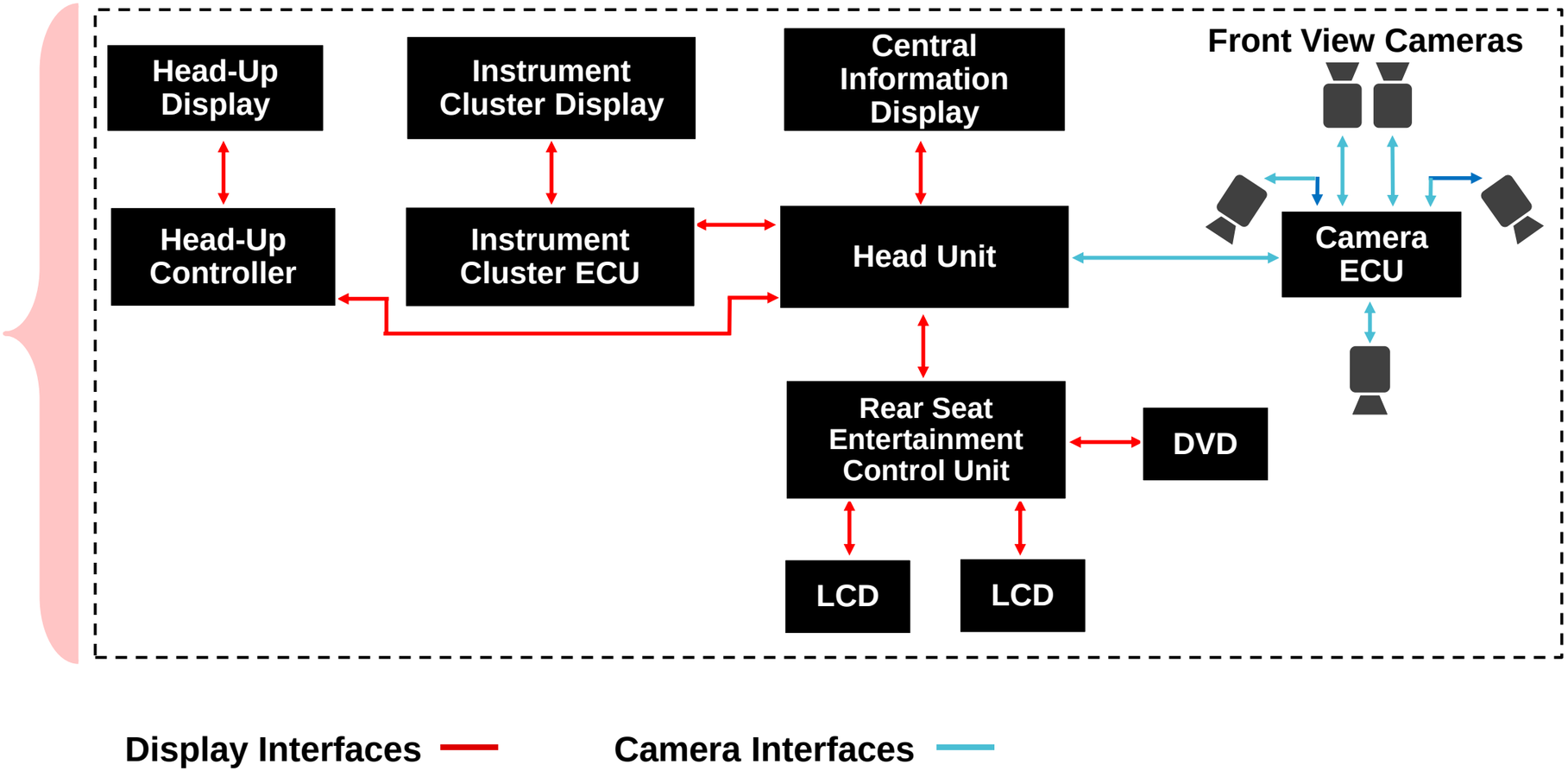
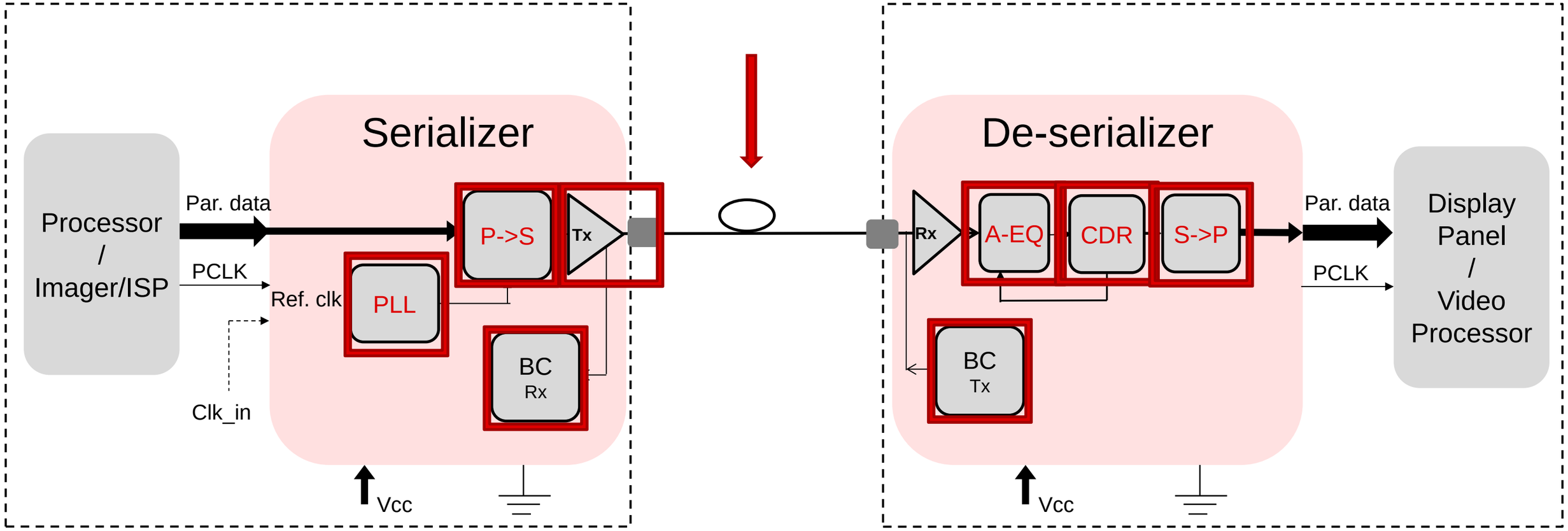
FPD-Link enables high-speed video transport





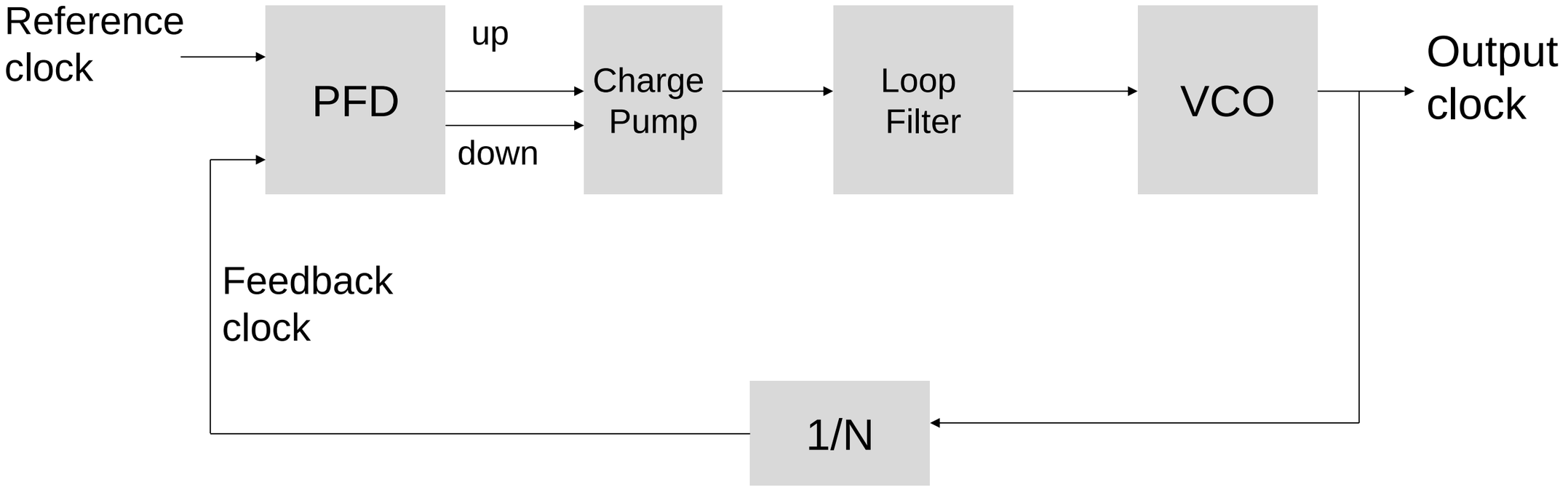
An example of high-speed serial FPD-Link

- Serialization reduces pin counts and connector requirements
- Adaptive Equalization and CDR techniques compensate for signal impairments

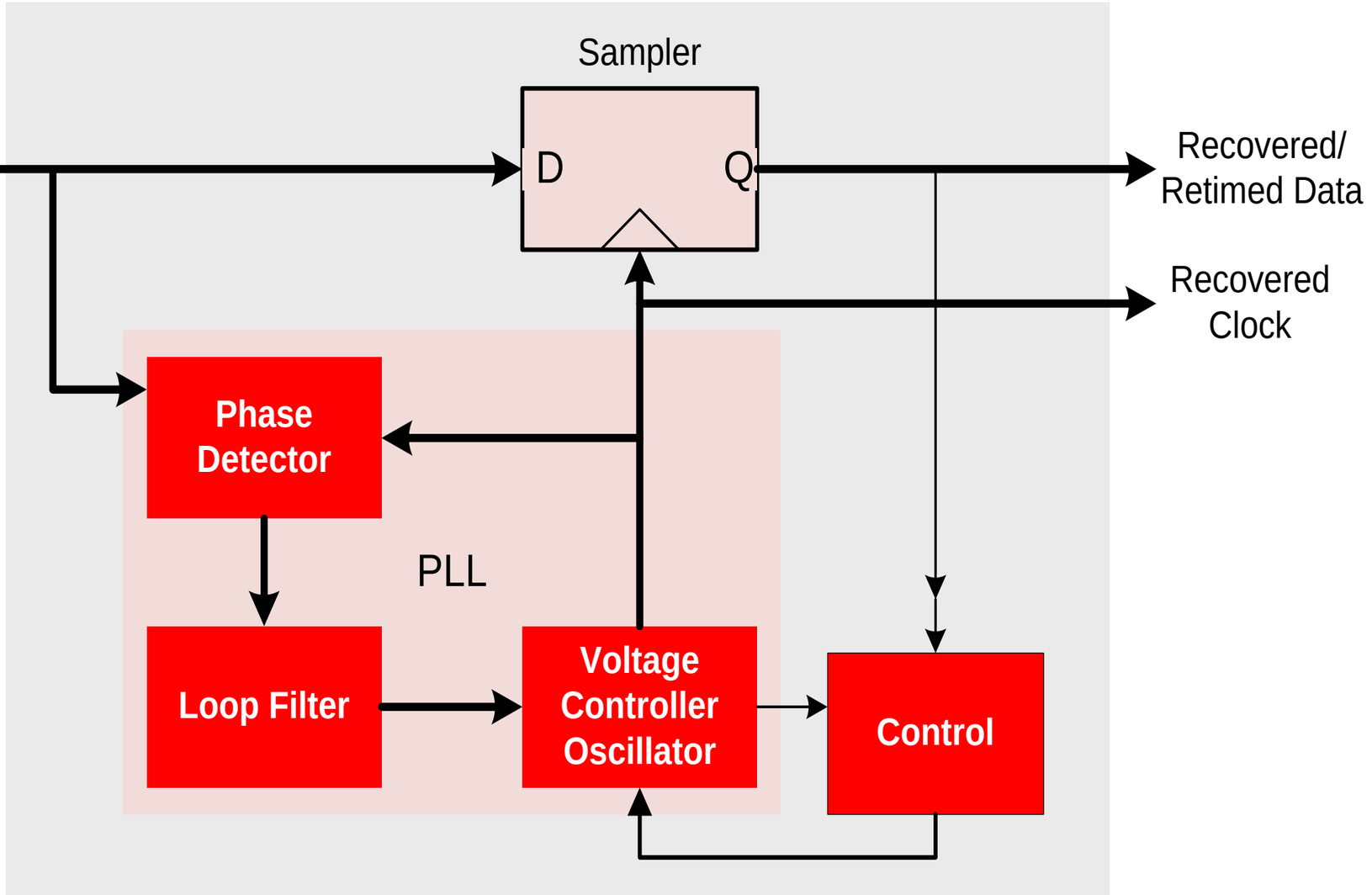


PLL in FPD-Link

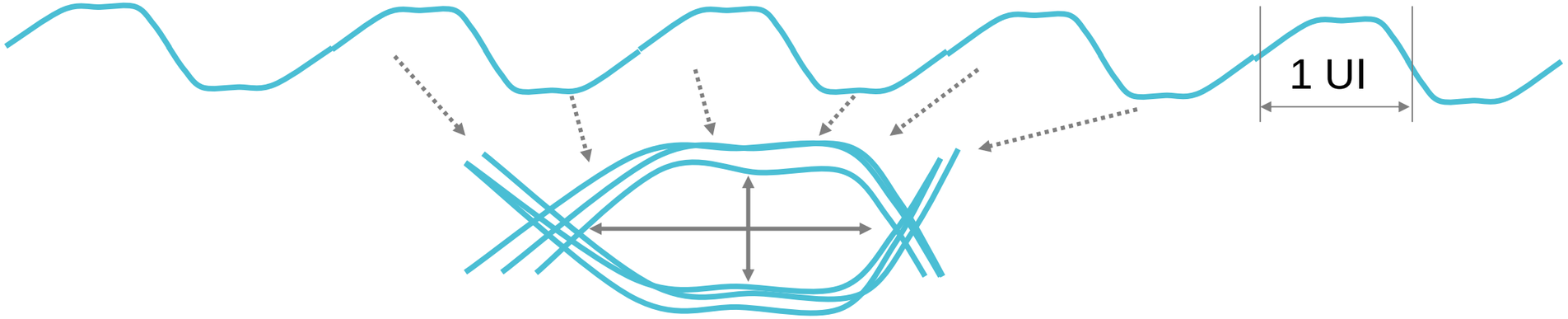
- PLL stands for Phase Locked Loop



Clock and Data Recovery circuit



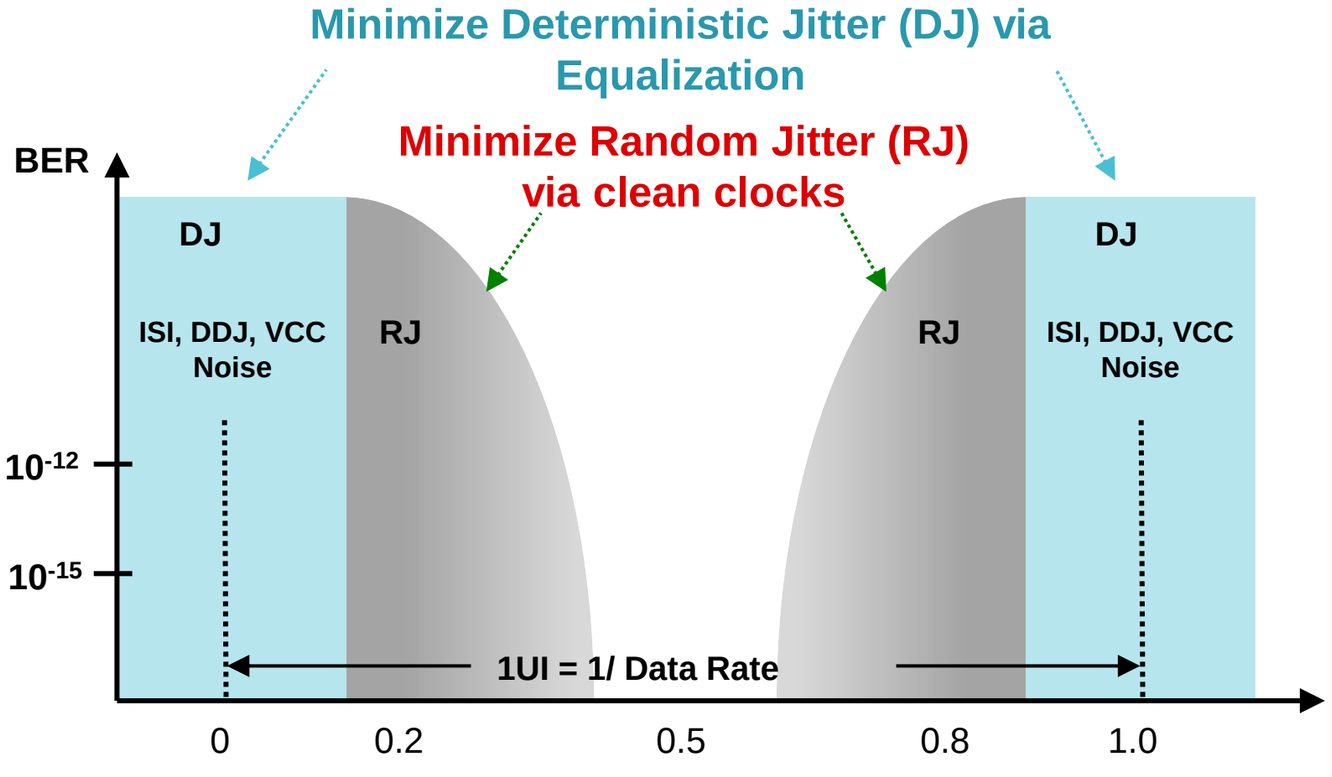
Eye diagram to study FPD-Link end-to-end jitter



- The size of the eye opening determines the quality of the signal

Jitter limits performance

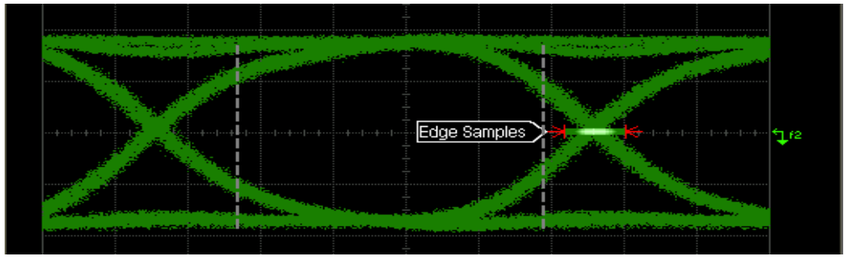
Bathtub Curve Performance



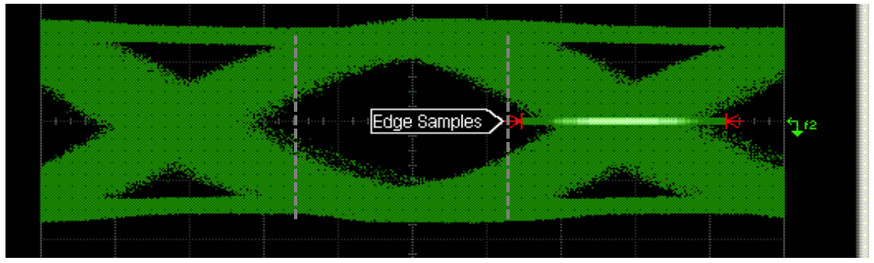
Random jitter reduces the eye opening

Scope Results

Eye Open



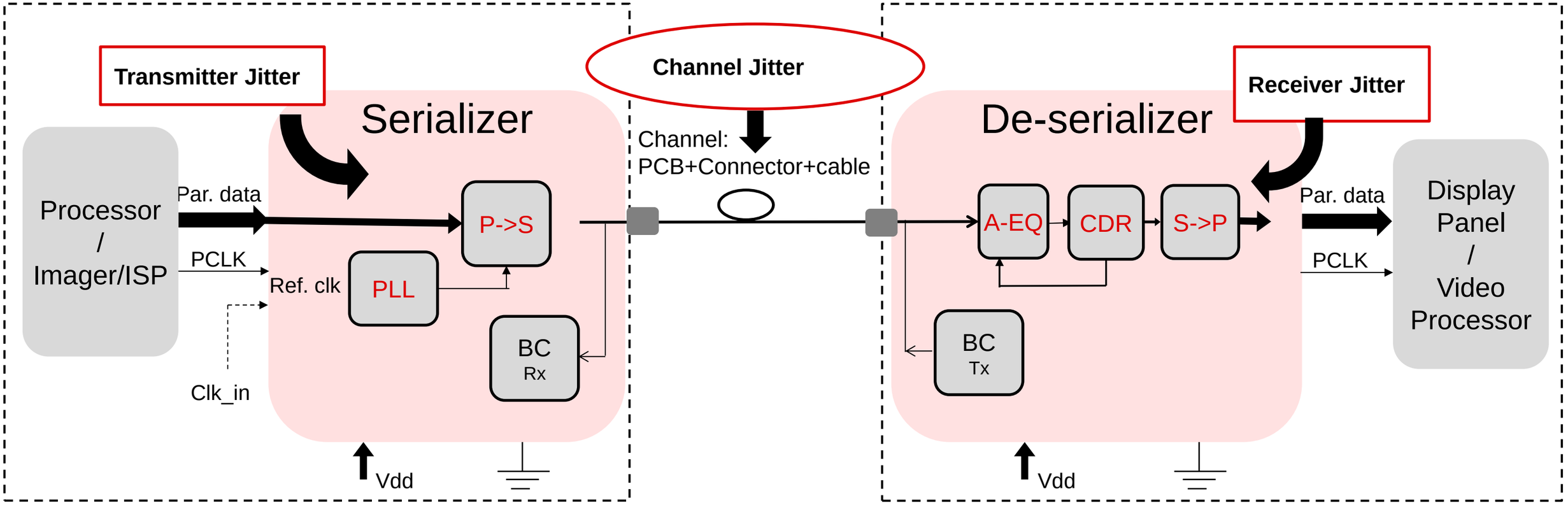
Eye closing due to jitter



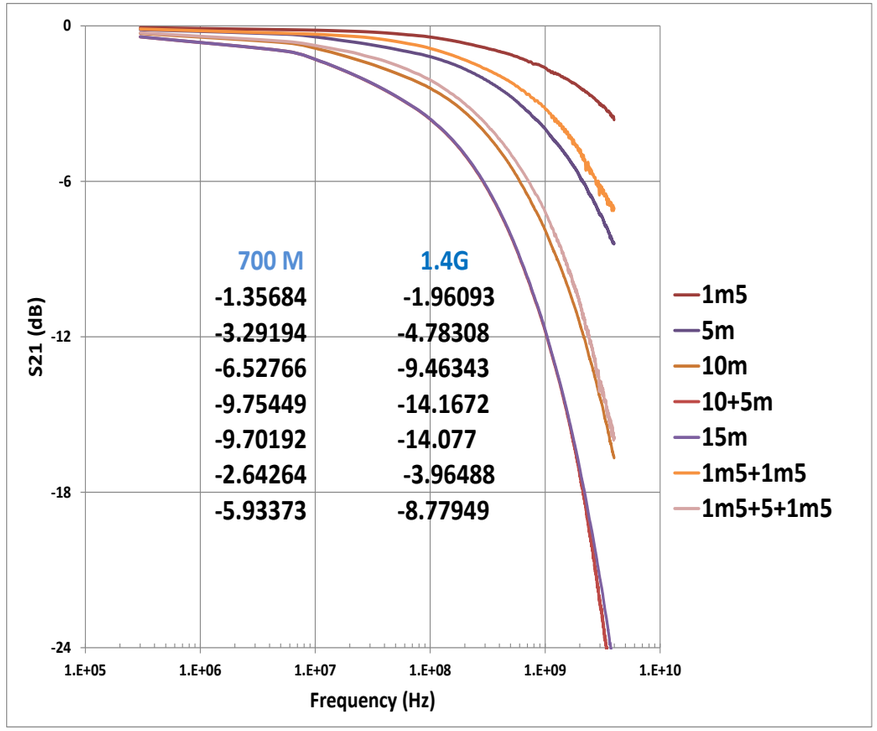
Clock jitter is a critical requirement in High Speed Serial Link

FPD-Link system jitter components

- 3 main system components: transmitter, channel & receiver jitter



Channel jitter due to PCB traces and cable

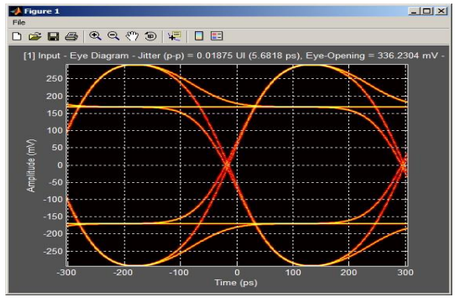


RG-174 Cable Attenuation Measurements (S21)

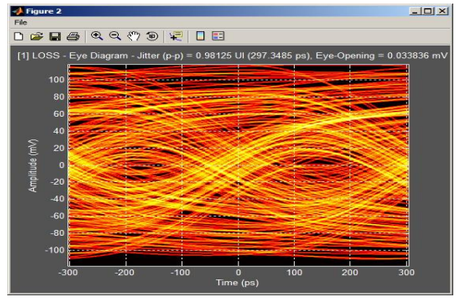
- Signal conditioning – coping with the loss
- Equalizing the channel – compensating for insertion loss in a channel

Channel Equalization

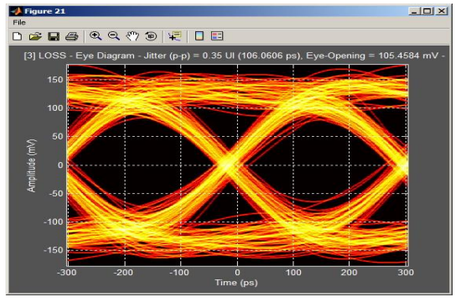
High-speed FPD-Link serializer output

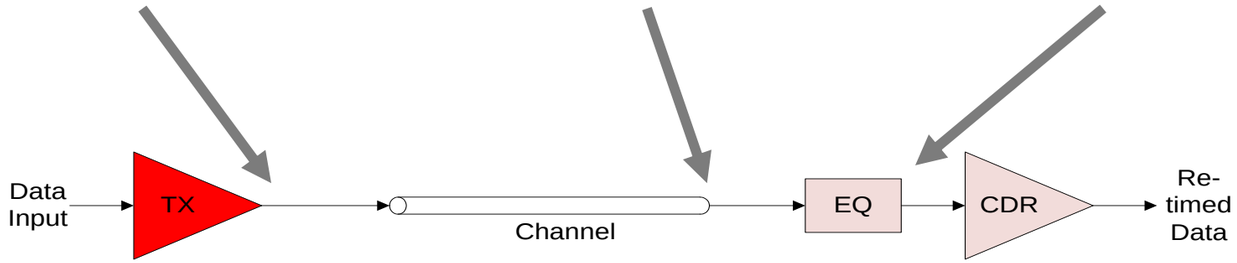


After the channel

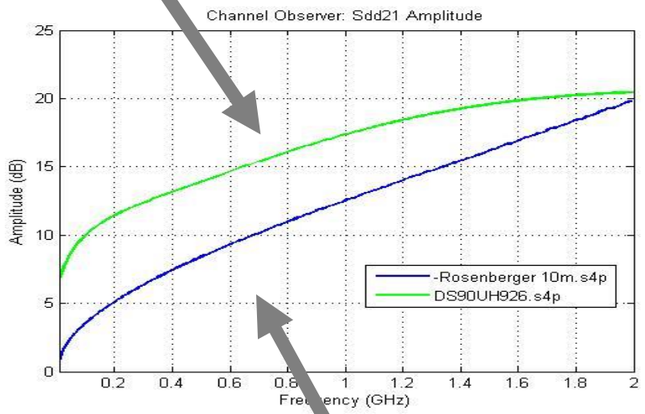


Equalized output





EQ characteristics



Inverted channel characteristics

Quiz

1. What kind of jitter is introduced due to signal attenuation inside a cable?
   a) Random Jitter
   ✓ b) Deterministic jitter
   c) Periodic jitter

2. What kind of method is used to compensate for random jitter introduced due to power supply noise?
   a) Adaptive Equalizer (AEQ)
   b) Random jitter introduced due to power supply cannot be reduced
   ✓ c) Some of the random jitter effects due to power supply noise can reduced by filtering the data stream

Thank you

To find more FPD-Link technical resources and search products, visit

ti.com/interface/fpd-link-serdes/products.html