

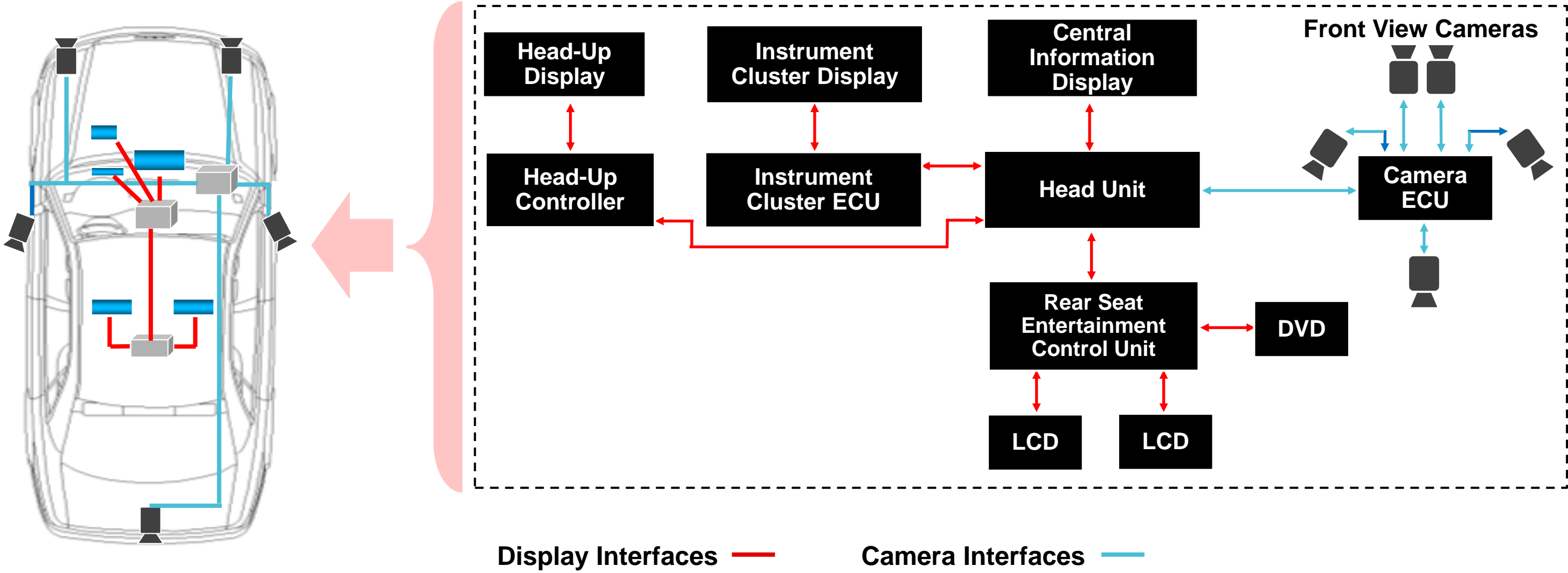
# High-speed communication with FPD-Link

TI Precision Labs - FPD-Link

Prepared by Vijaya Ceekala

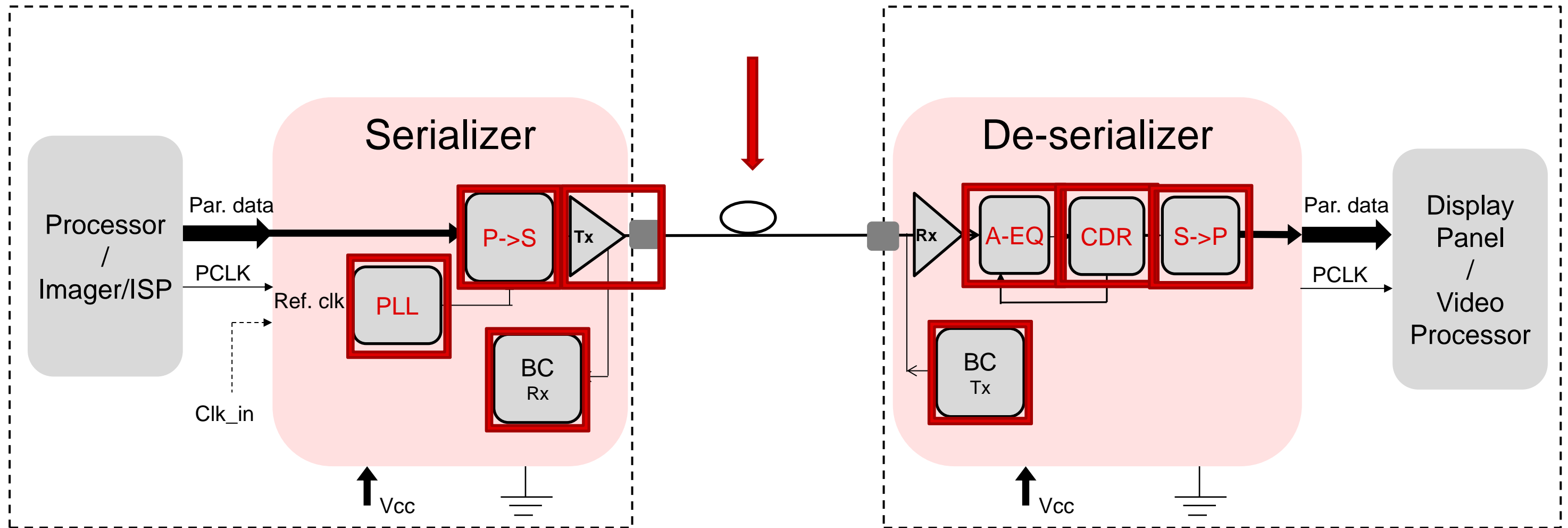
Presented by Casey McCrea

# FPD-Link enables high-speed video transport



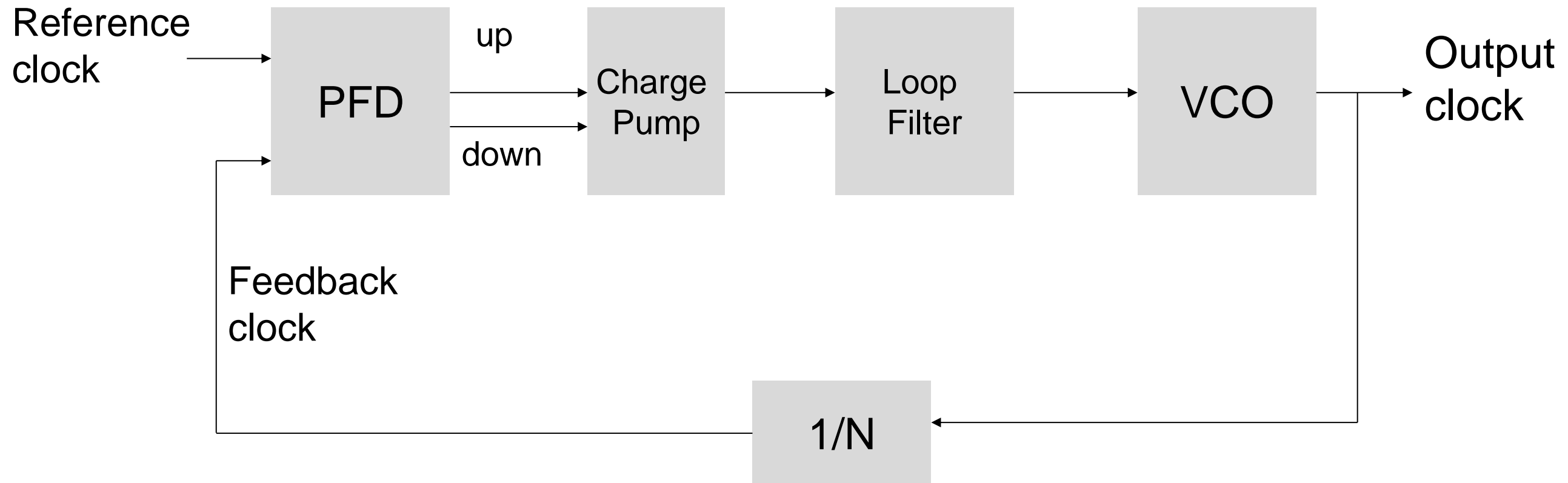
# An example of high-speed serial FPD-Link

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

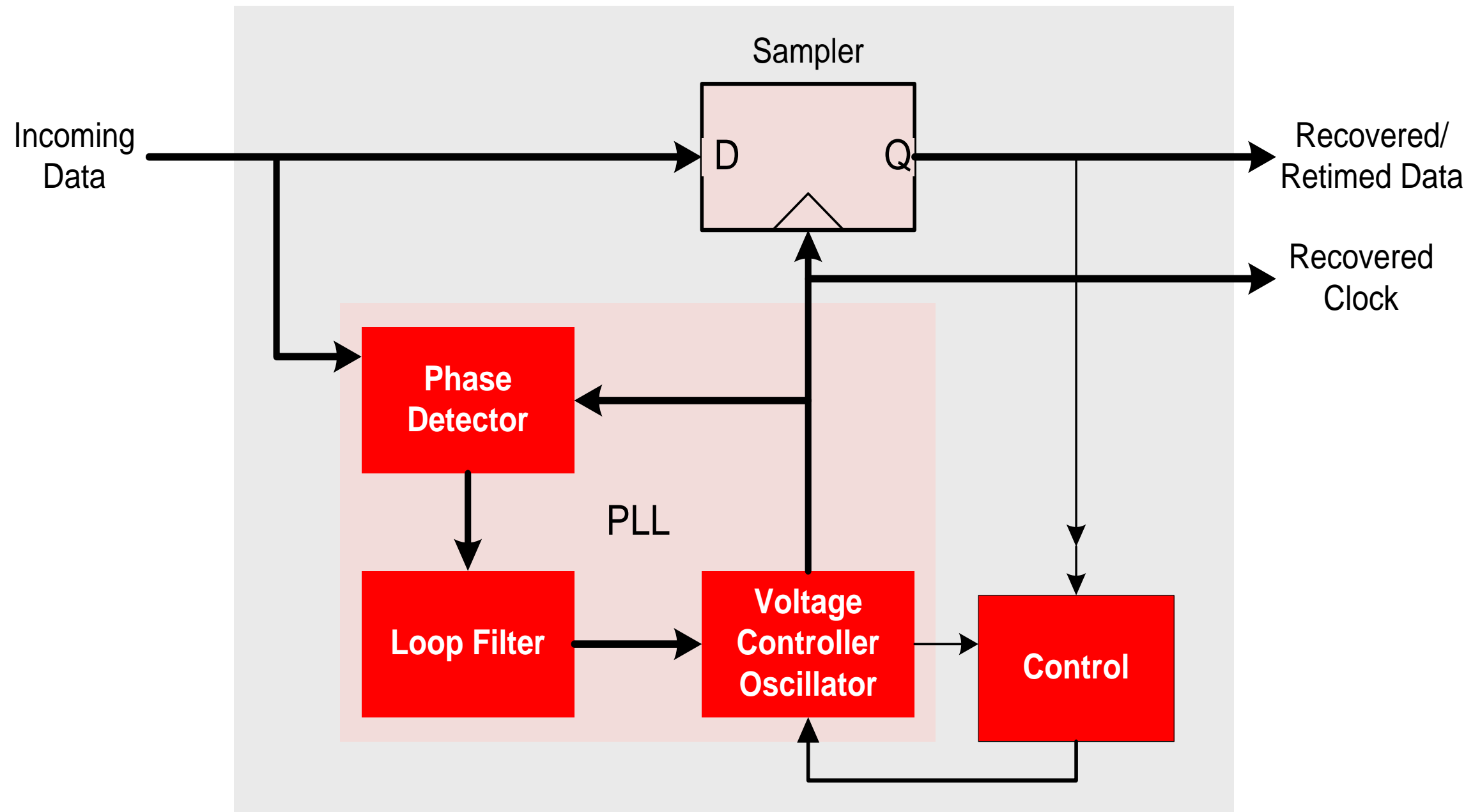


# PLL in FPD-Link

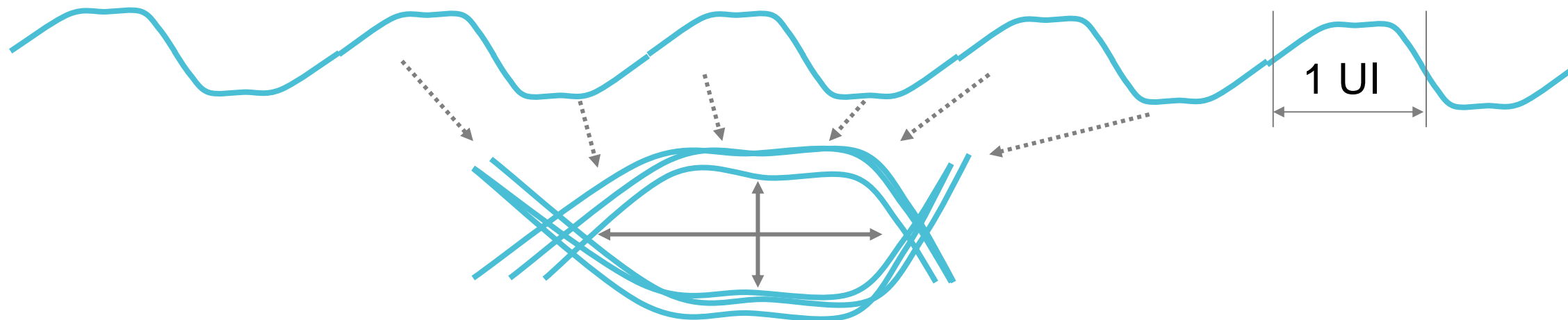
- PLL stands for Phase Locked Loop



# Clock and Data Recovery circuit



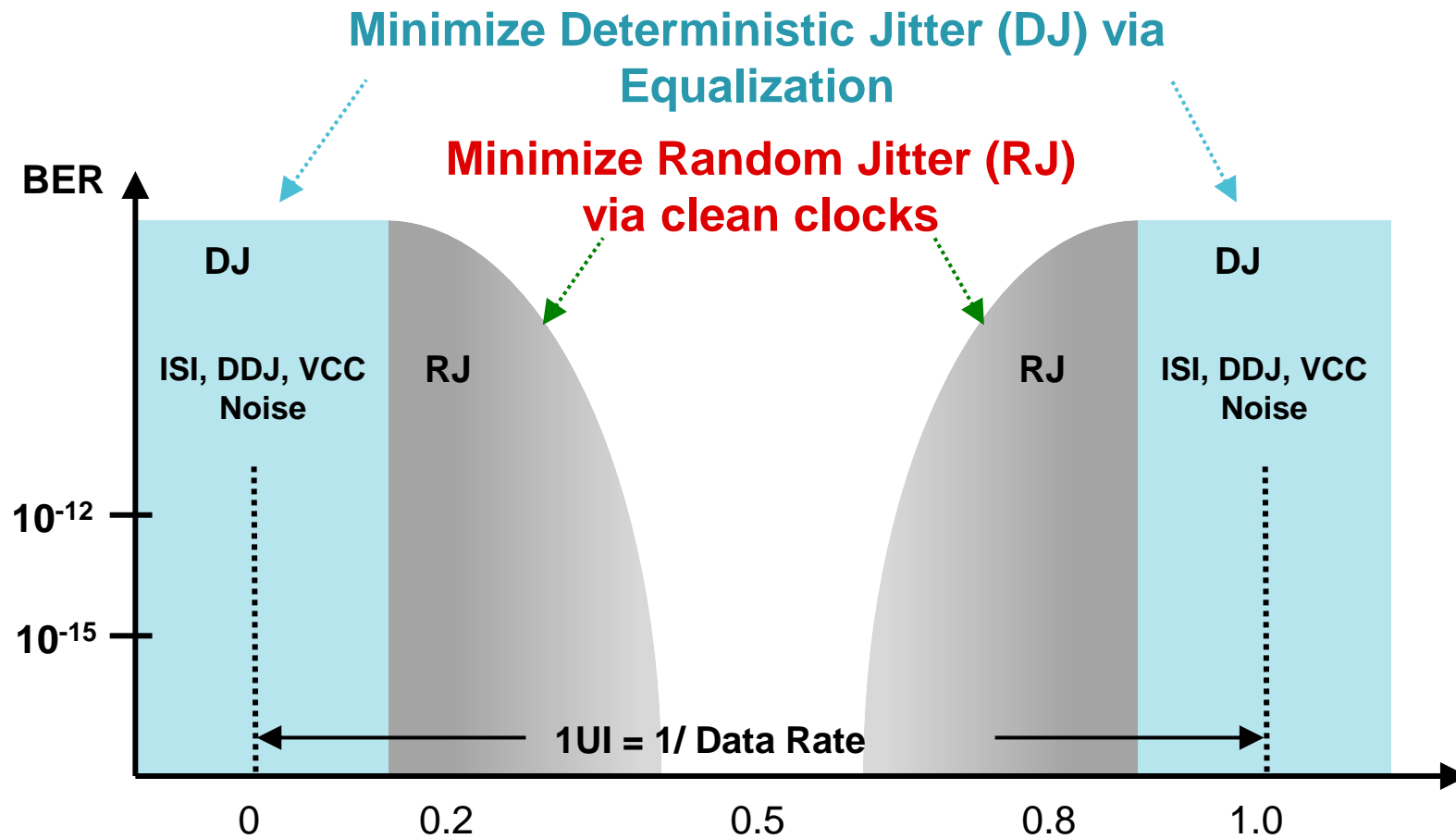
# Eye diagram to study FPD-Link end-to-end jitter



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

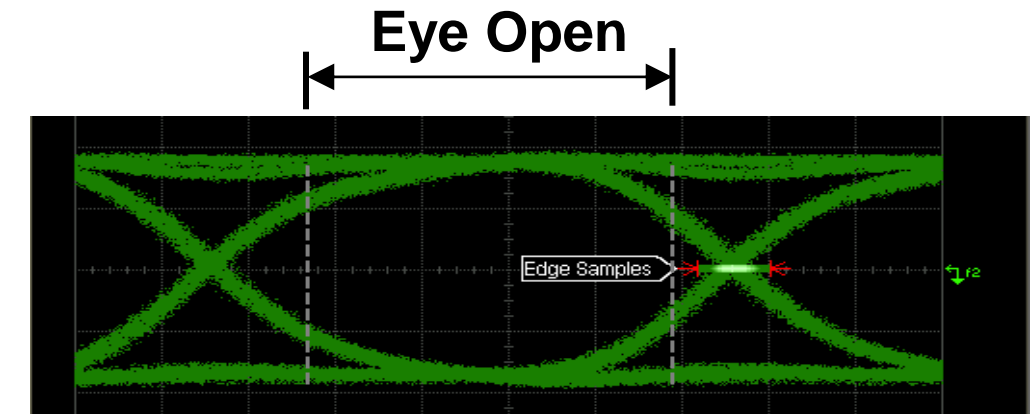
# Jitter limits performance

## Bathtub Curve Performance

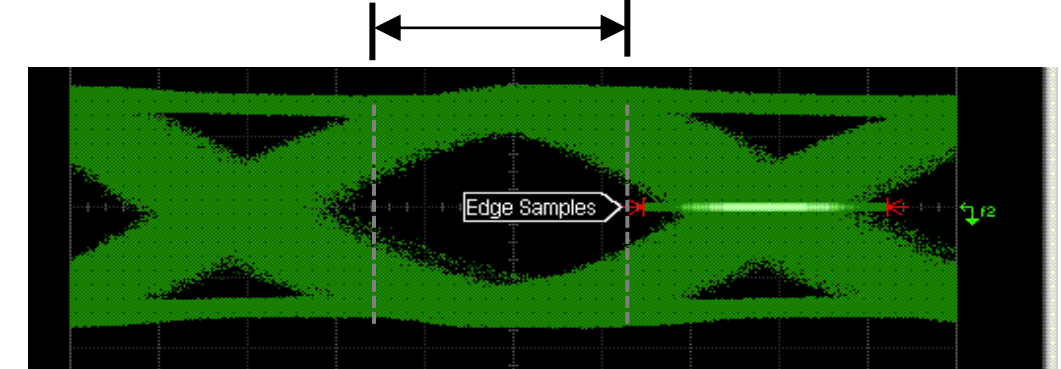


*Random jitter reduces the eye opening*

## Scope Results



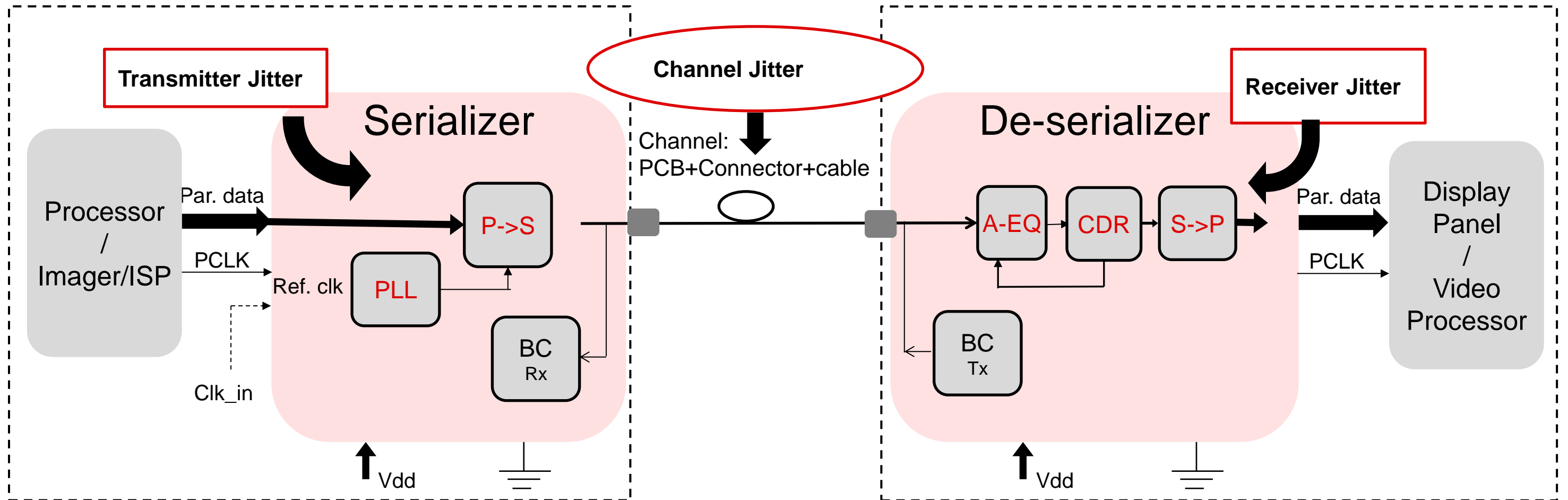
**Eye closing due to jitter**



*Clock jitter is a critical requirement in High Speed Serial Link*

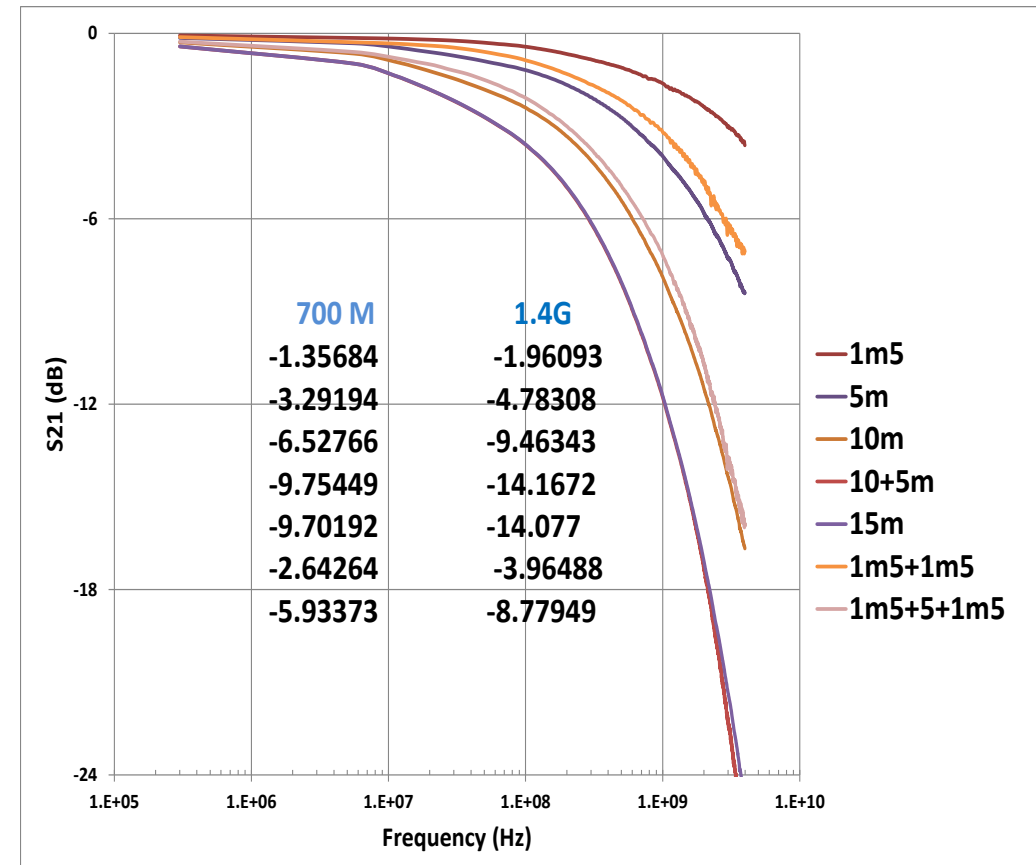
# FPD-Link system jitter components

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





# Channel jitter due to PCB traces and cable

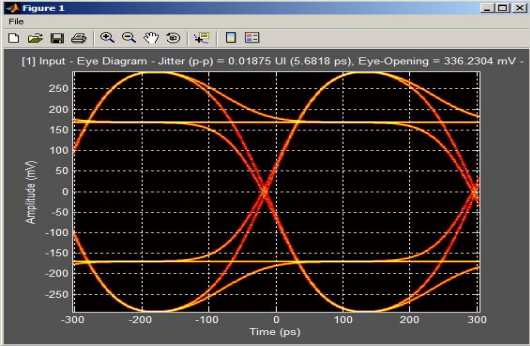


RG-174 Cable Attenuation Measurements (S21)

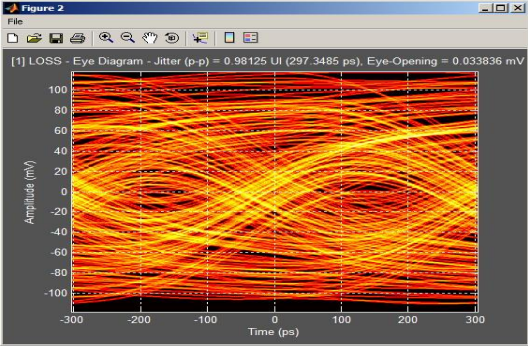
- Signal conditioning – coping with the loss
- Equalizing the channel – compensating for insertion loss in a channel

# Channel Equalization

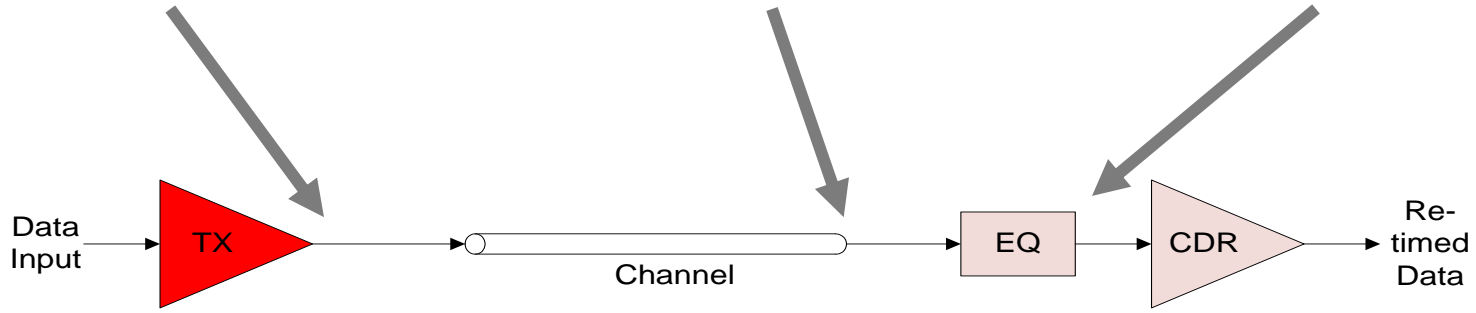
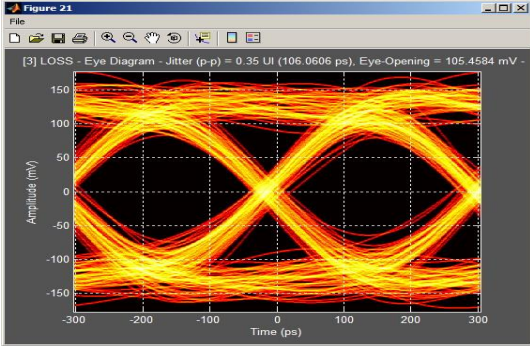
High-speed FPD-Link serializer output



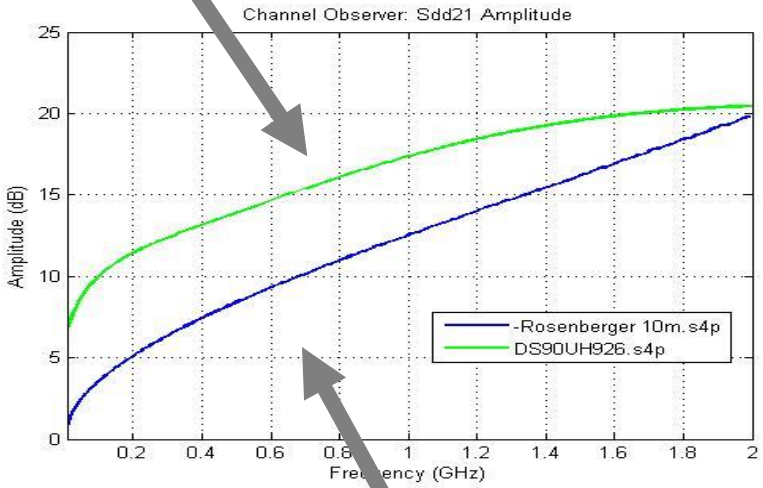
After the channel



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 be 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](https://ti.com/interface/fpd-link-serdes/products.html)

The screenshot displays the Texas Instruments website interface for FPD-Link SerDes products. At the top, the TI logo and "TEXAS INSTRUMENTS" are visible, along with a search bar. A red navigation bar contains links for Products, Applications, Design resources, Quality & reliability, Support & training, Order now, and About TI. Below this, the breadcrumb "TI Home > Interface > FPD-Link SerDes" is shown. The main heading is "Interface", with sub-tabs for Overview, Products (selected), Reference designs, and Support & training. A sidebar menu icon is on the left. The main content area is titled "FPD-Link SerDes - Products" and features a "Quick search" section with the following filters:

- Function: Select (dropdown)
- Output compatibility: Select (dropdown)
- Color depth (bpp): Range from 8 to 30 (slider and input boxes)
- Features: Select (dropdown)
- Input compatibility: Select (dropdown)
- Total throughput (Mbps): Range from 600 to 13312 (slider and input boxes)