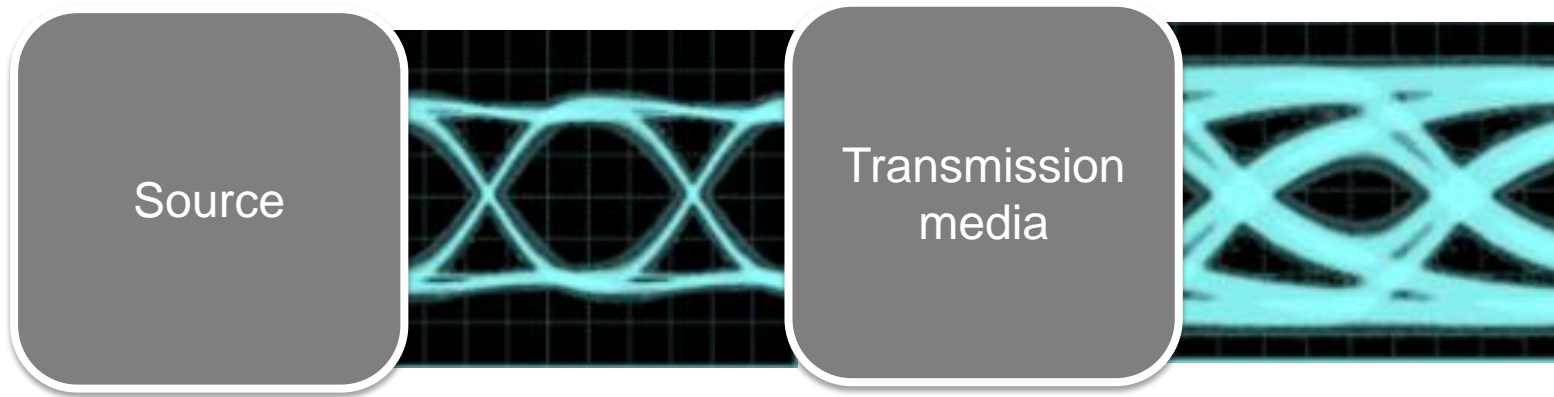


Differences between linear and limiting redrivers

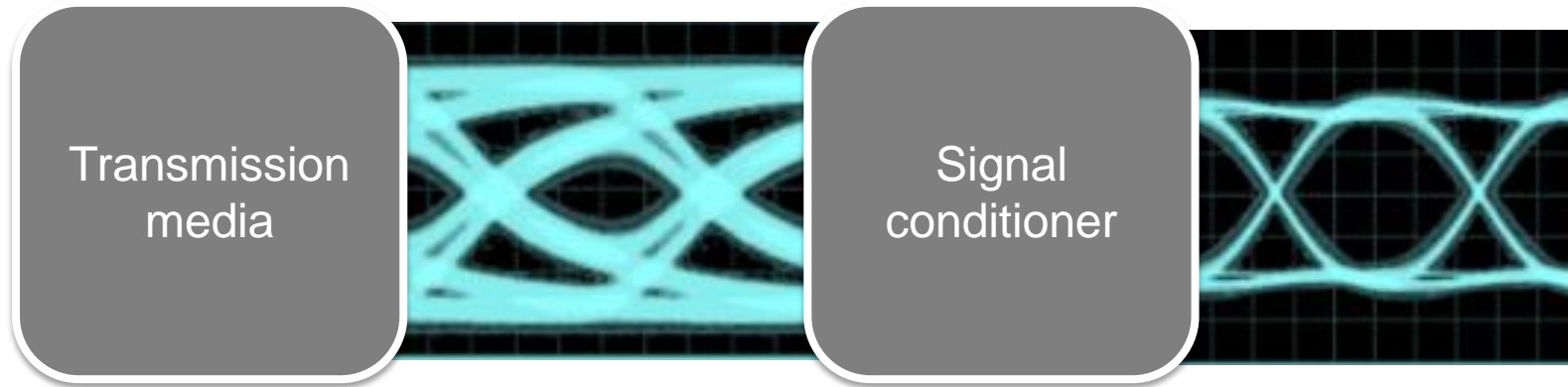
TI Precision Labs – Signal Conditioning

Prepared by David Liu, Malik Barton

What is a signal conditioner?

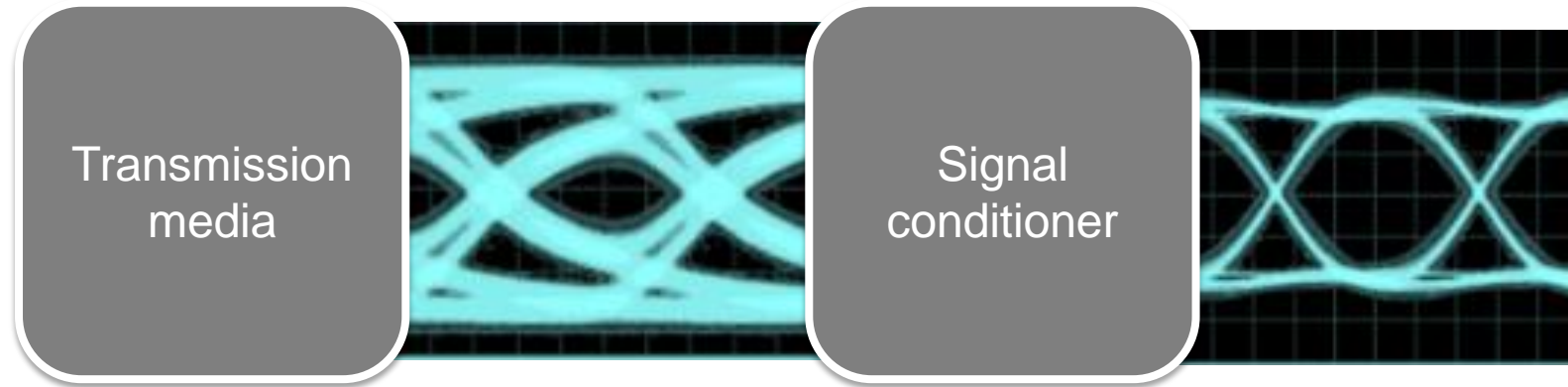


What is a signal conditioner?



A signal conditioner, in the form of a redriver or retimer, is used to correct signal integrity issues that produce less than desired bit error rate (BER).

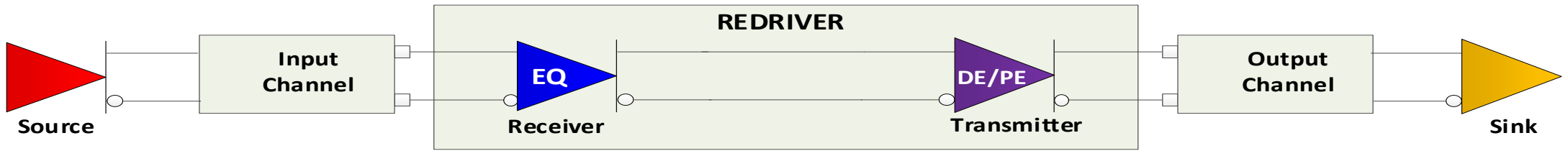
What is a signal conditioner?



Use cases:

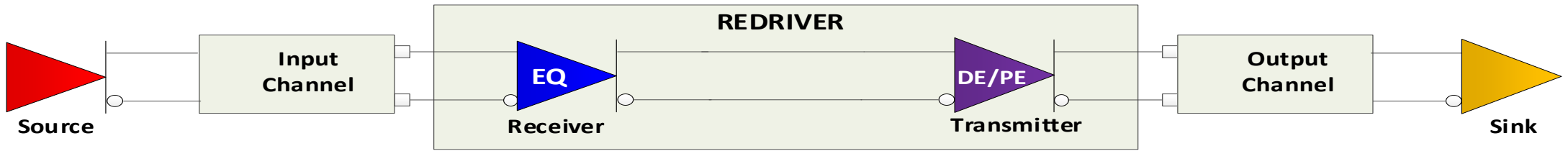
- Extending a device's operating range to meet system form-factor requirements.
- Correct a device's short-comings.

What is a redriver?



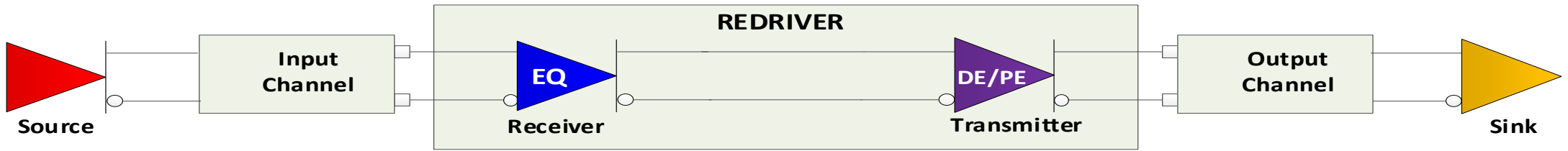
A redriver is a protocol agnostic analog component that provides a compensation of an attenuated signal using an equalizer function on its receiver side.

What is a redriver?



The transmitter drives the equalized signal.

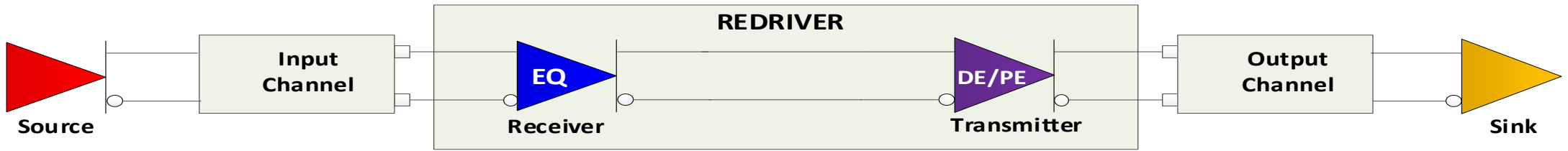
What is a redriver?



A redriver cleans up ISI-related deterministic jitter with the proper equalization.

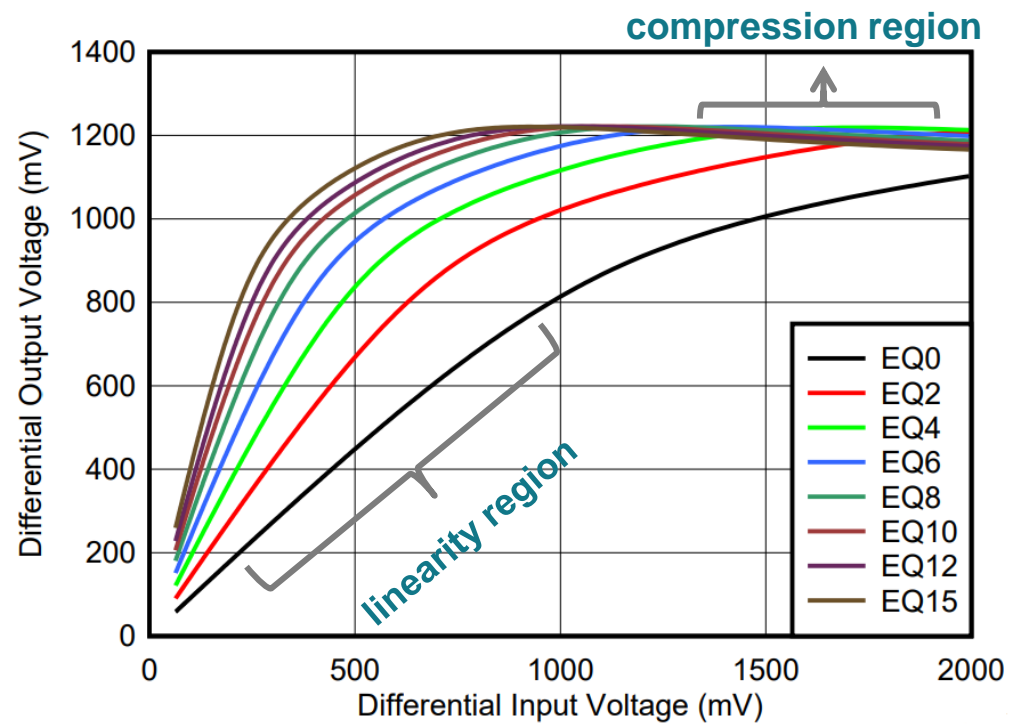
Random and non-ISI related deterministic jitter will pass from the redriver input to the output.

What is a redriver?



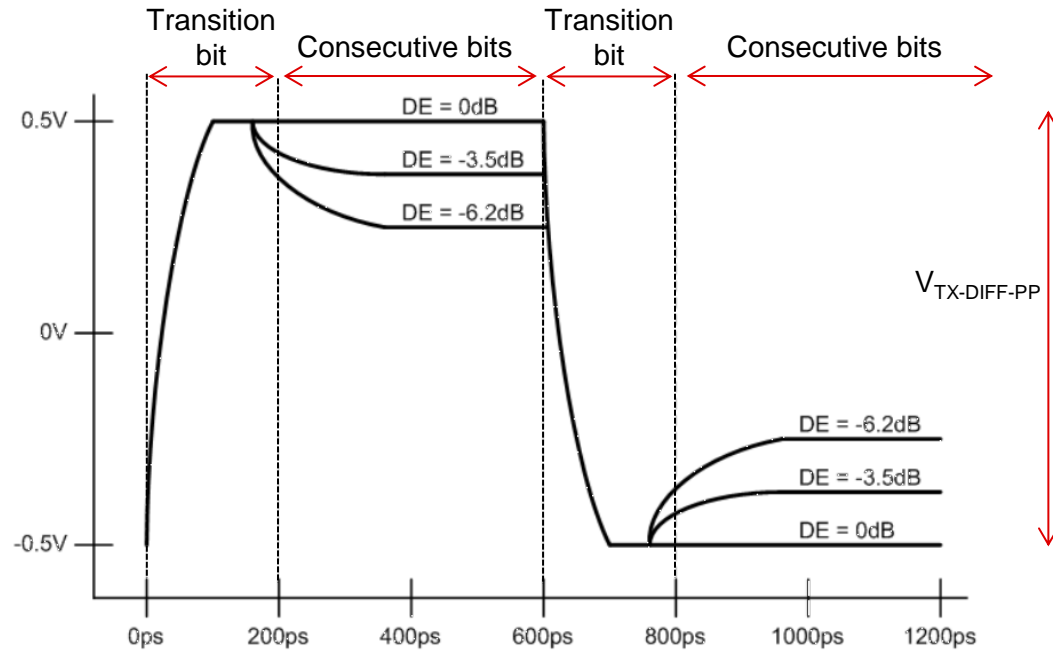
A redriver can be “linear” or “non-linear (limited)”.

What is a linear redriver?



- Signal outputs are a linear function of the input
- Linearity persists up to a certain input amplitude
- Pass through all electrical characteristics of a source signal

What is a limited redriver?



- Signal outputs are not a linear function of the input
- Output swing control or output de-emphasis or pre-emphasis
- Reflection and crosstalk are converted into deterministic jitter

What are the different advantages of redriver types?

Feature	Linear	Limiting
Does not break or interfere with DP link training solving a long standing issue in the DP eco-system	Yes	No
USB receive channel EQ flexibility between long and short RX channel	Yes	No
Adjustable transmit voltage swing	No	Yes
Adjustable transmit de-emphasis or pre-emphasis	No	Yes
Make non-compliant TX swing VOD or de-emphasis/pre-emphasis level compliant	No	Yes

Short quiz

- True or False: Redriver can clean up random jitter
- True or False: Linear redrivers have signal outputs that are a linear function of the input
- True or False: A redriver is the same as a retimer
- True or False: A limited redriver has TX SWING VOD and De-emphasis/Pre-emphasis control

Short quiz

- True or False: Redriver can clean up random jitter
-False
- True or False: Linear redrivers have signal outputs that are a linear function of the input
- True or False: A redriver is the same as a retimer
- True or False: A limited redriver has TX SWING VOD and De-emphasis/Pre-emphasis control

Short quiz

- True or False: Redriver can clean up random jitter
-False
- True or False: Linear redrivers have signal outputs that are a linear function of the input
-True
- True or False: A redriver is the same as a retimer
- True or False: A limited redriver has TX SWING VOD and De-emphasis/Pre-emphasis control

Short quiz

- True or False: Redriver can clean up random jitter
-False
- True or False: Linear redrivers have signal outputs that are a linear function of the input
-True
- True or False: A redriver is the same as a retimer
– False
- True or False: A limited redriver has TX SWING VOD and De-emphasis/Pre-emphasis control

Short quiz

- True or False: Redriver can clean up random jitter
-False
- True or False: Linear redrivers have signal outputs that are a linear function of the input
-True
- True or False: A redriver is the same as a retimer
– False
- True or False: A limited redriver has TX SWING VOD and De-emphasis/Pre-emphasis control
– True

Thank you

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2,270
Contributing TI employees

345,592
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