

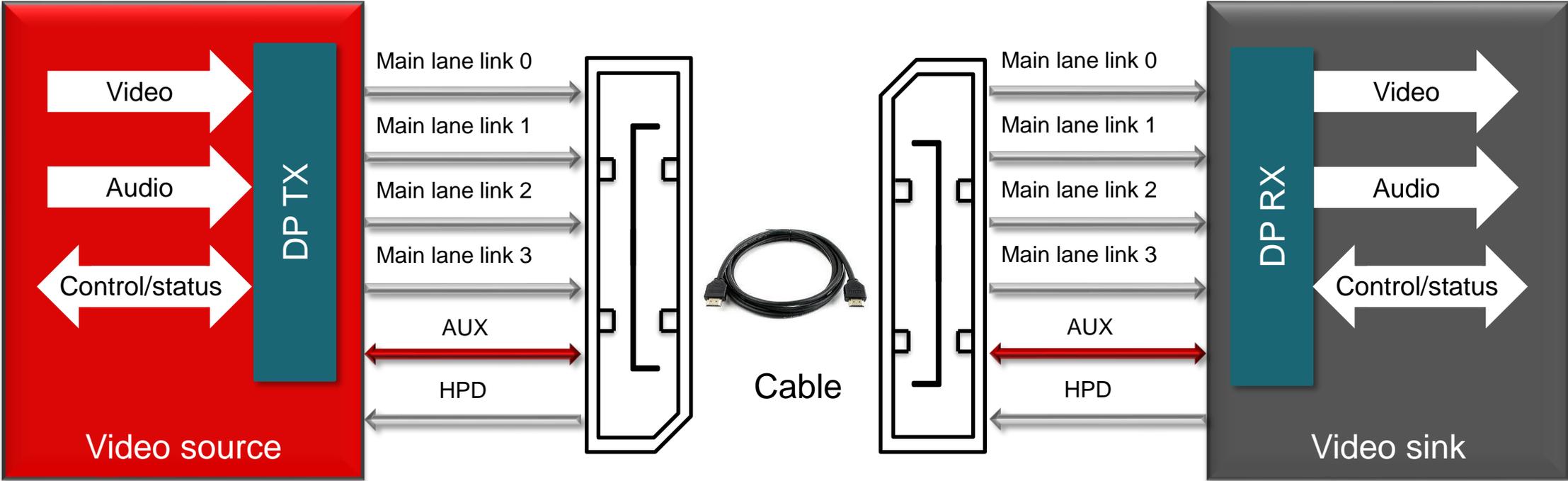
# Understanding DisplayPort Link Training

TI Precision Labs – Video Interface

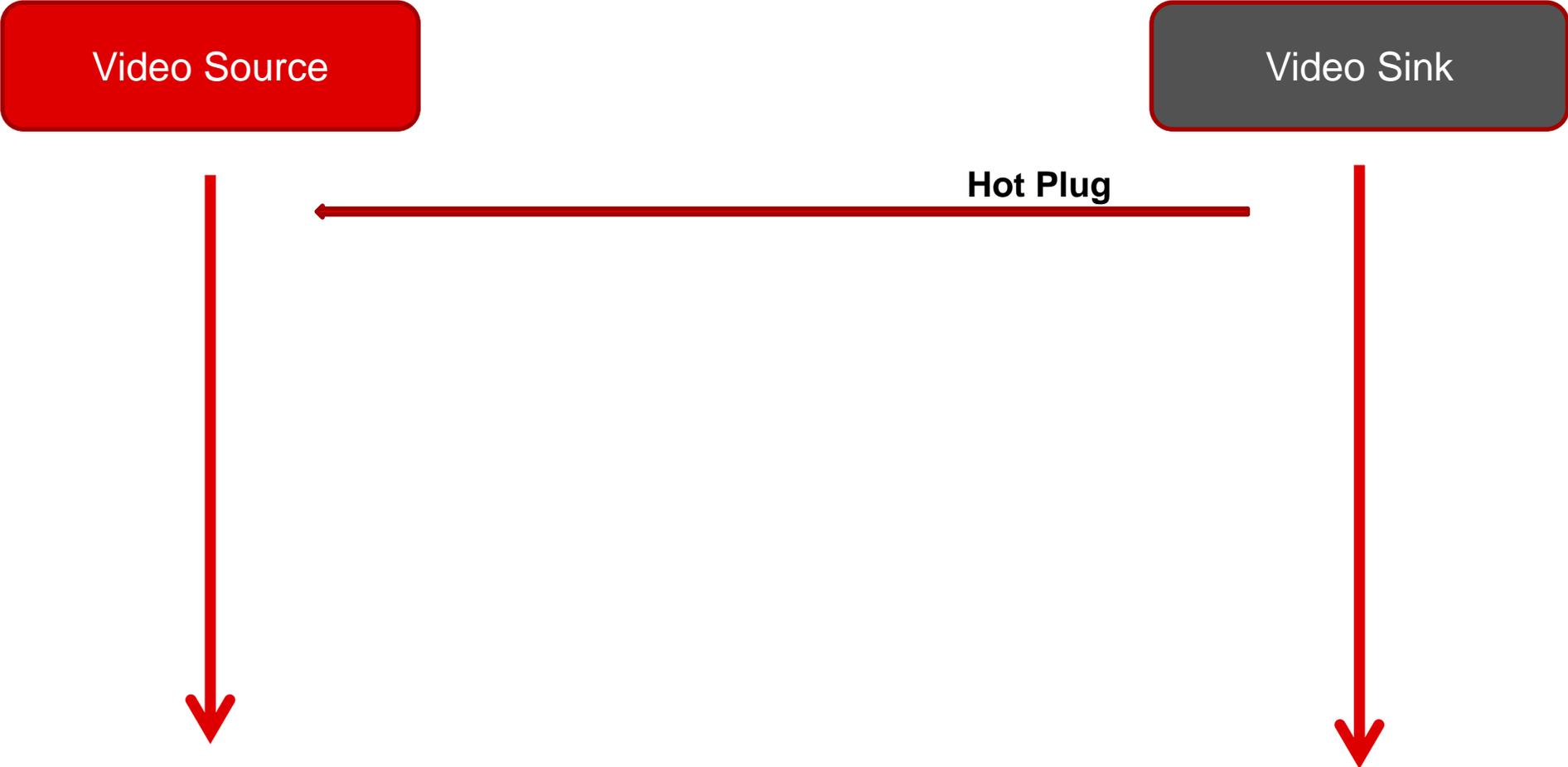
Prepared by David Liu

Presented by Nicholas Malone

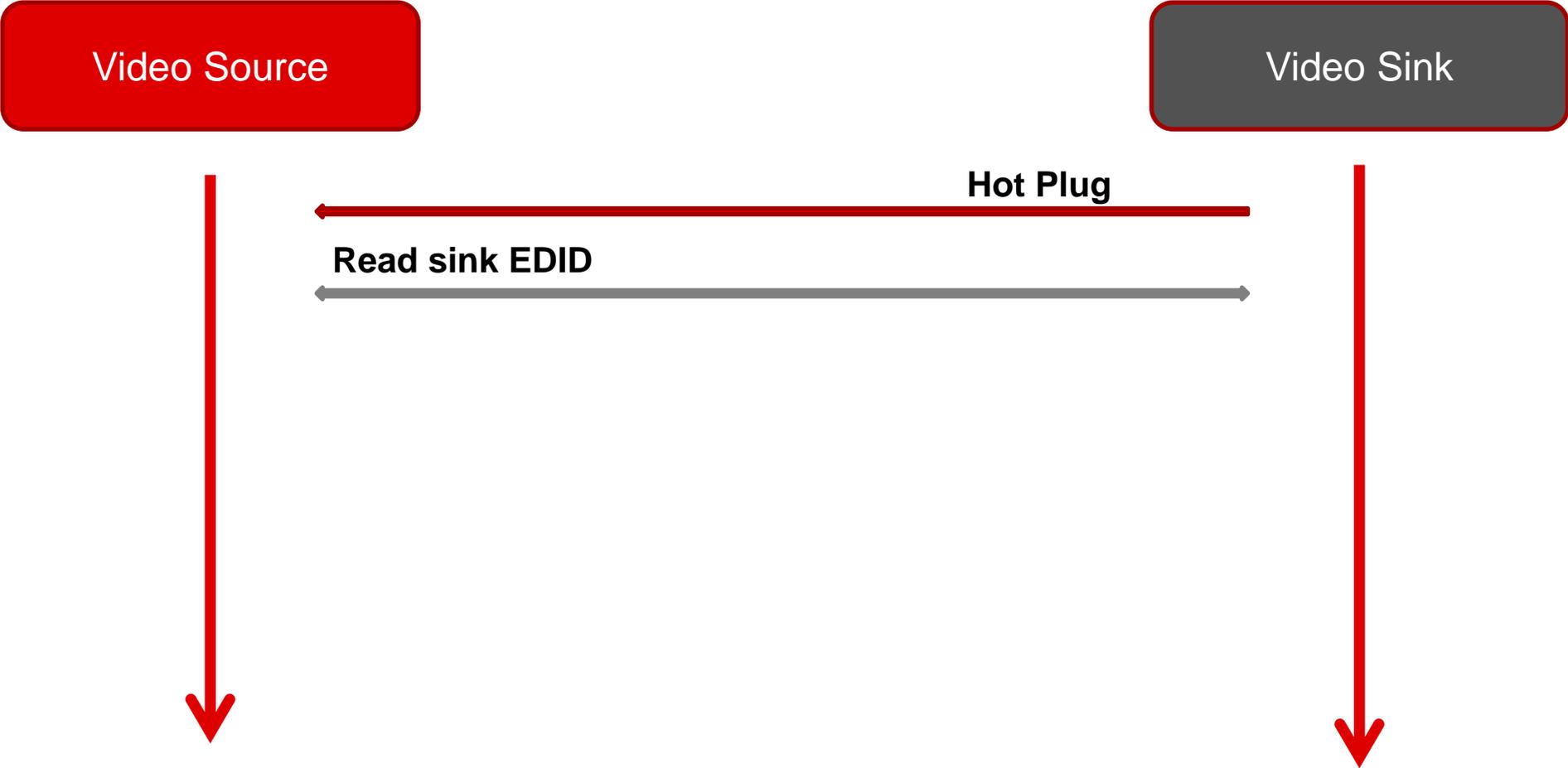
# DisplayPort™ signal interface



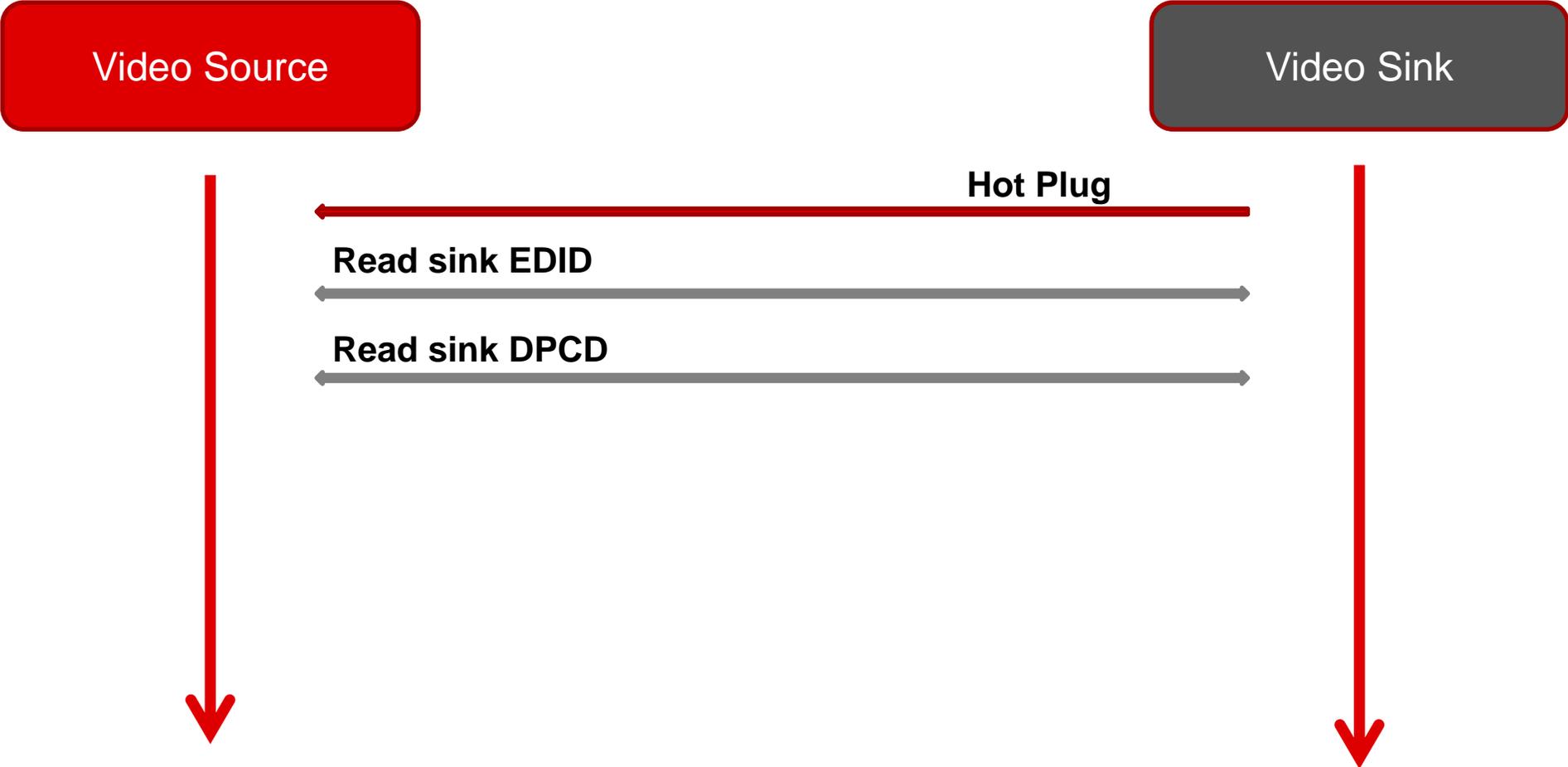
# DP connection sequence step 1



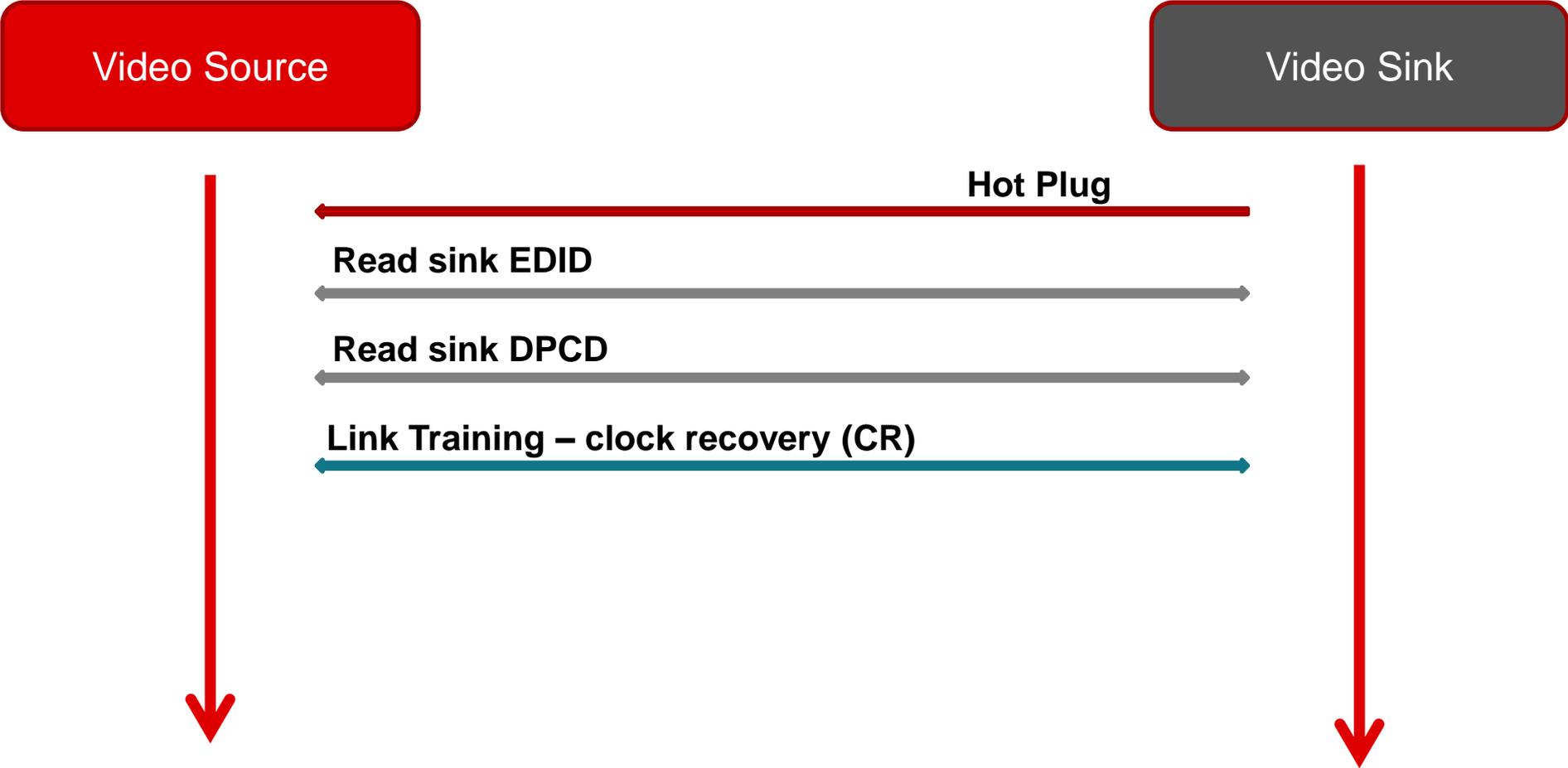
# DP connection sequence step 2



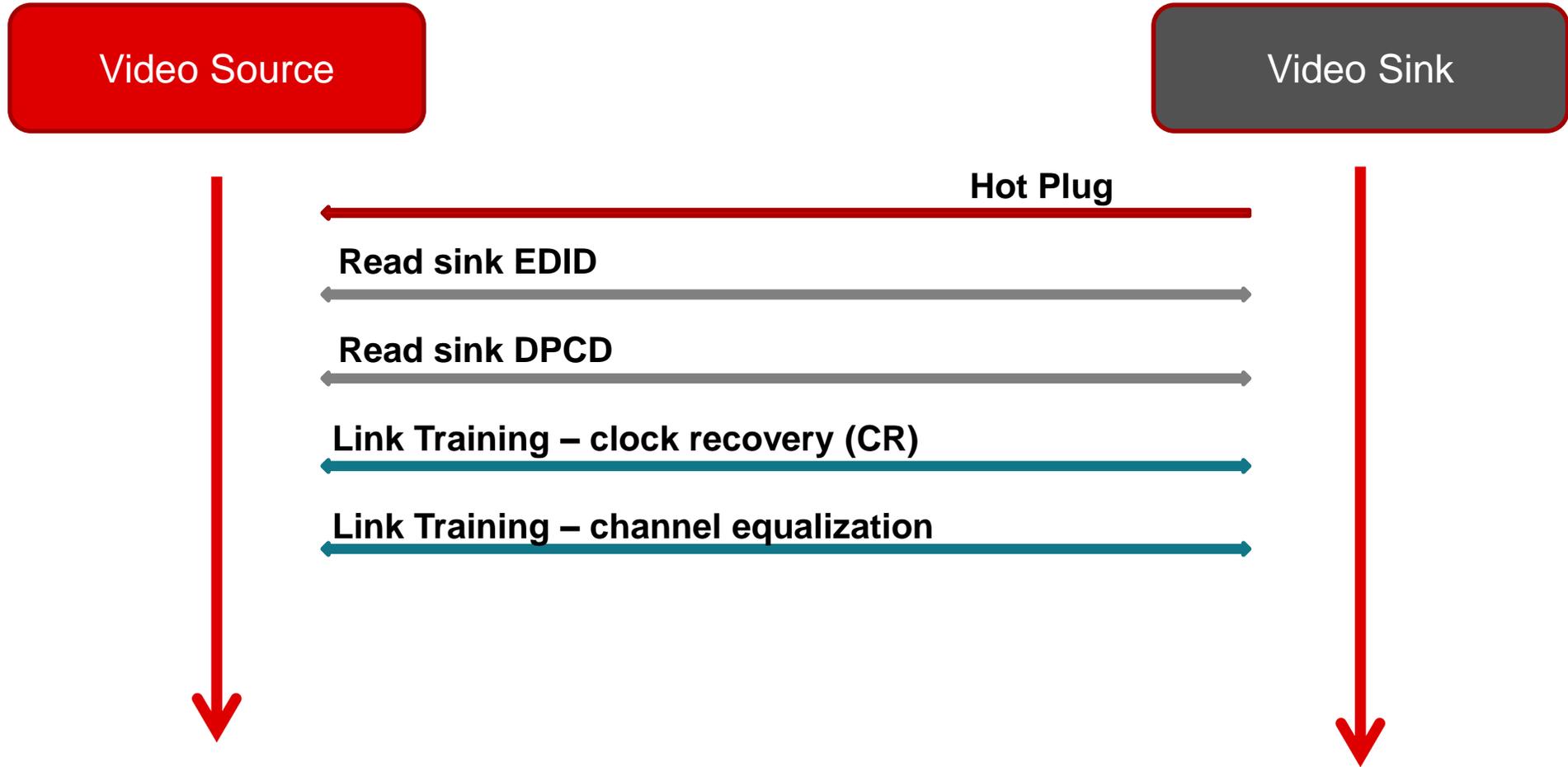
# DP connection sequence step 3



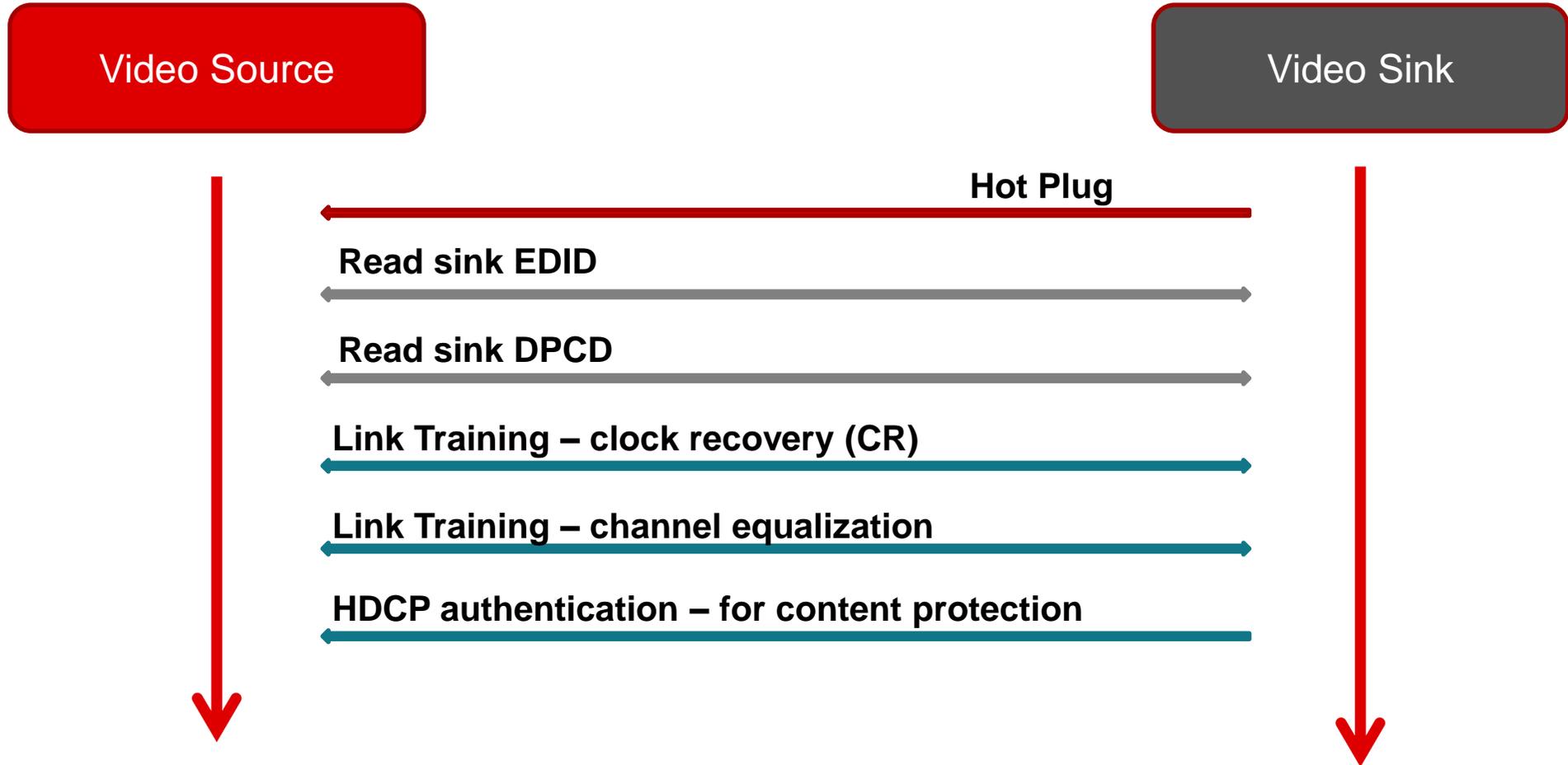
# DP connection sequence step 4



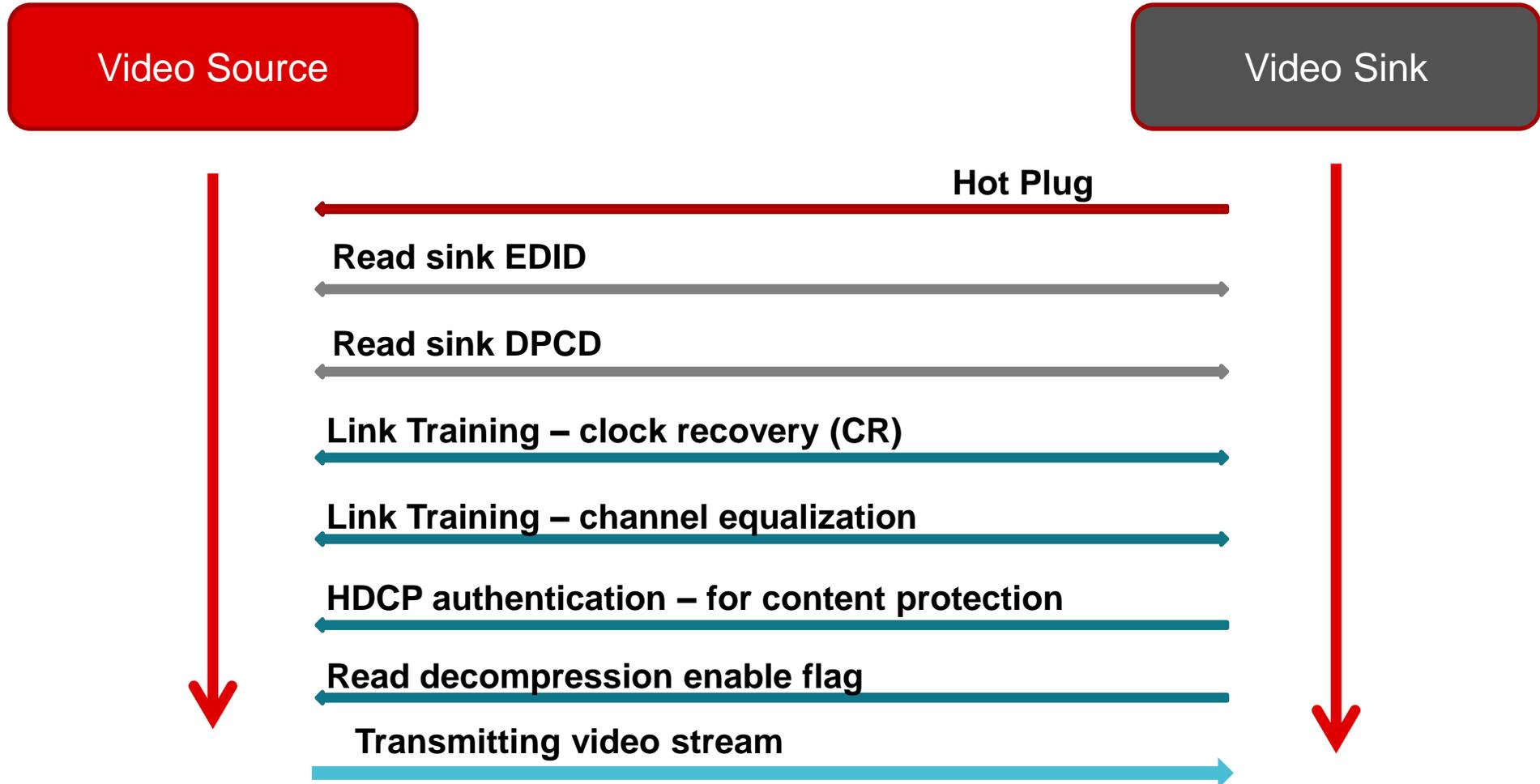
# DP connection sequence step 5



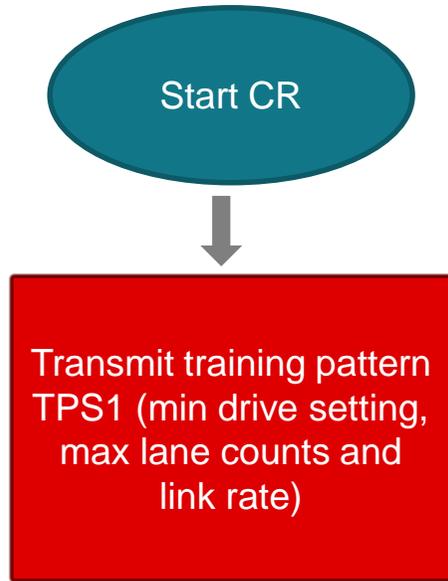
# DP connection sequence step 6



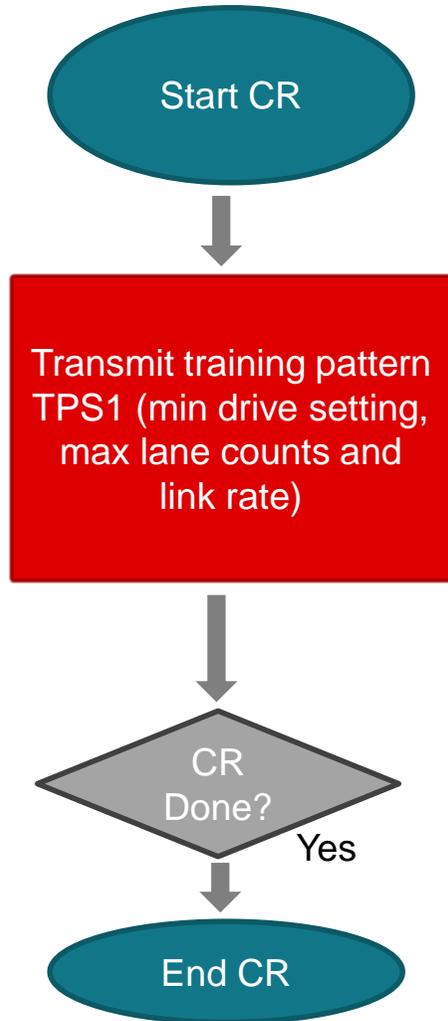
# DP connection sequence step 7



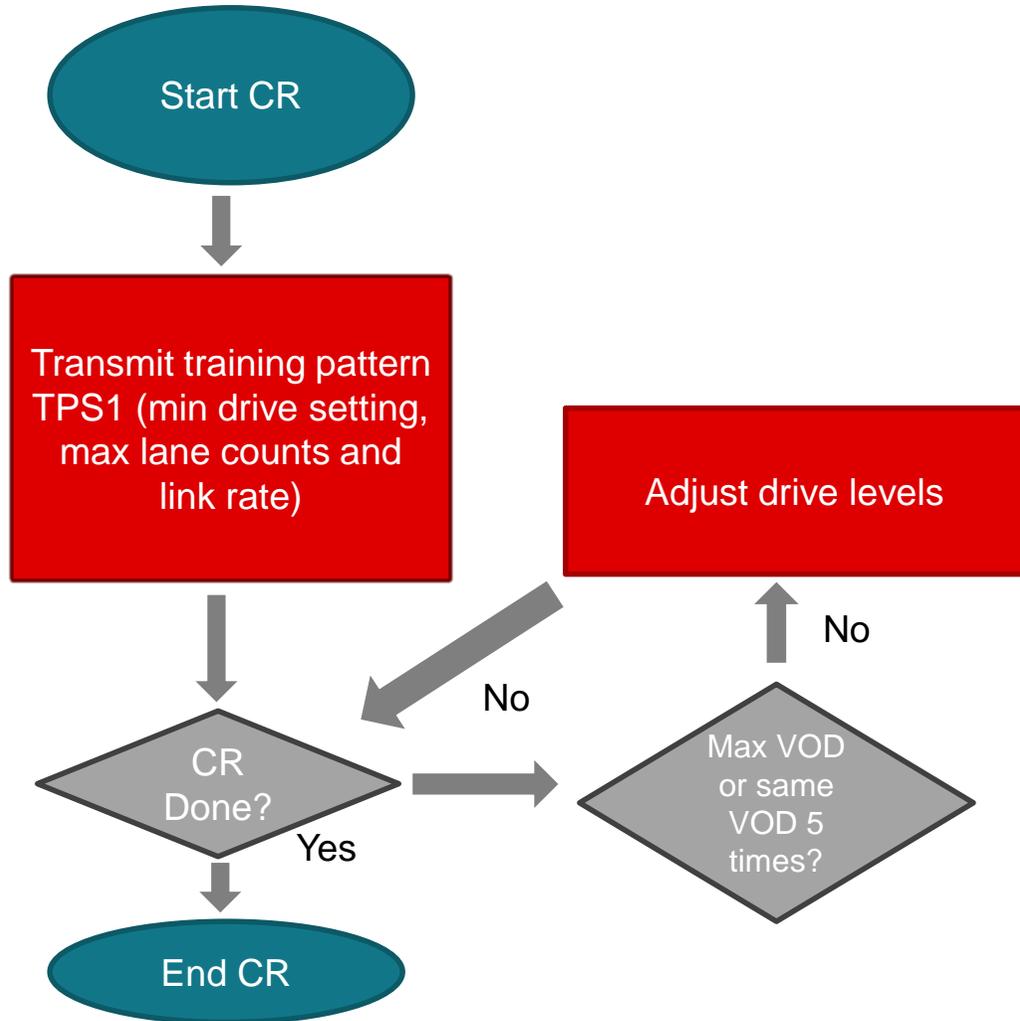
# Clock recovery sequence step 1



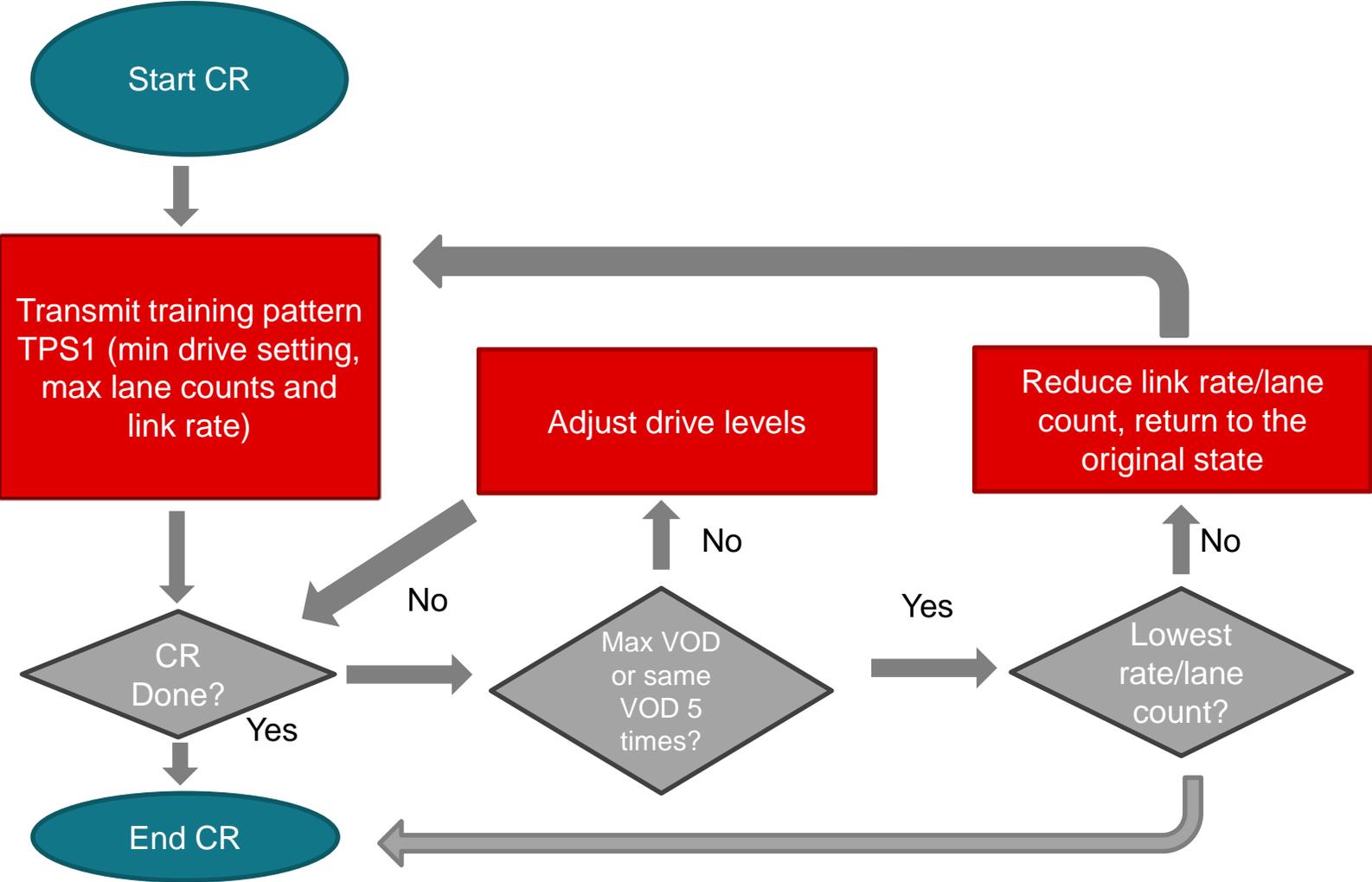
# Clock recovery sequence step 2



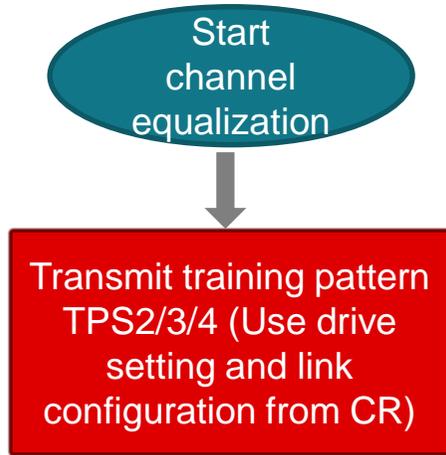
# Clock recovery sequence step 3



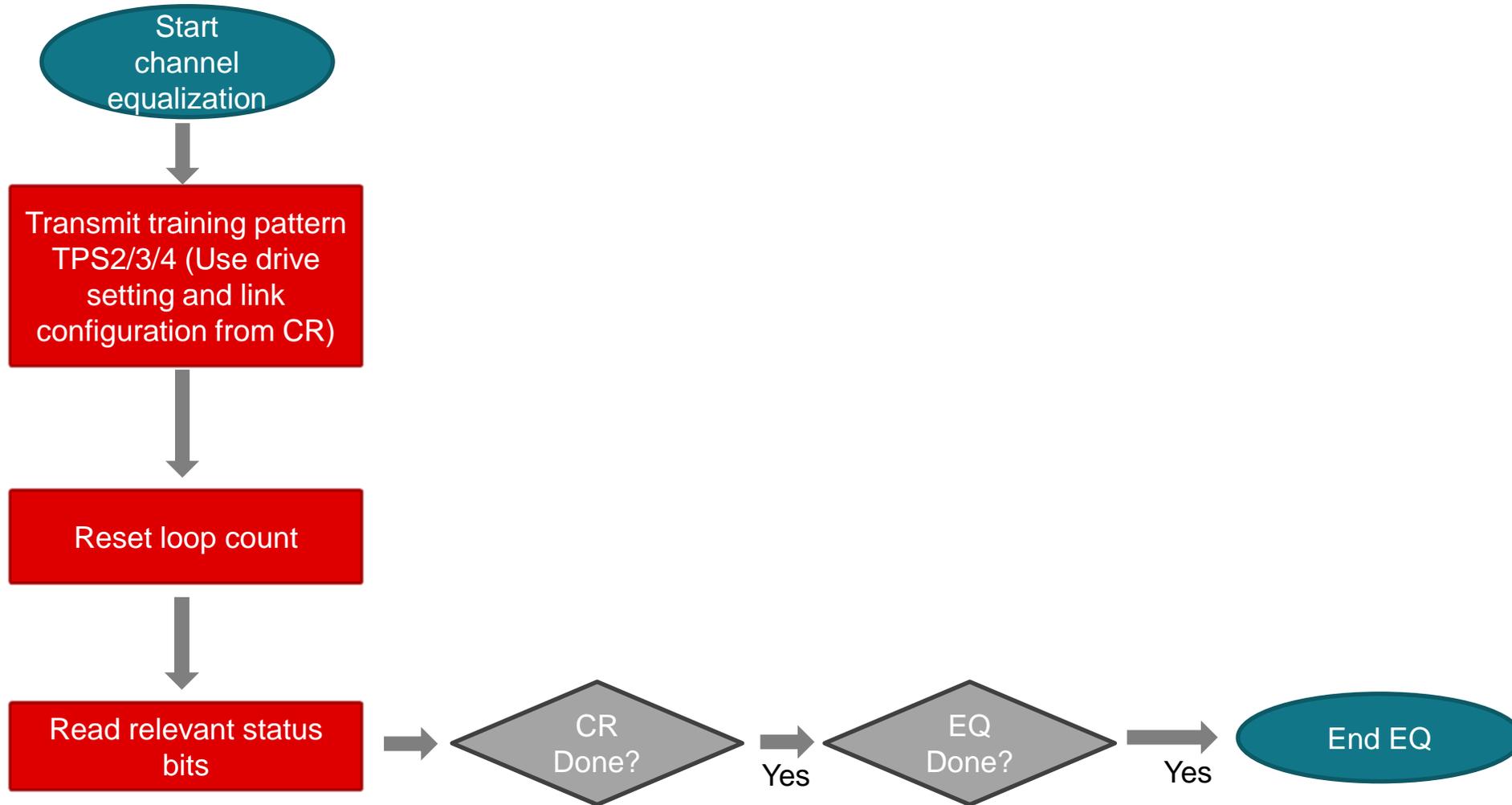
# Clock recovery sequence step 4



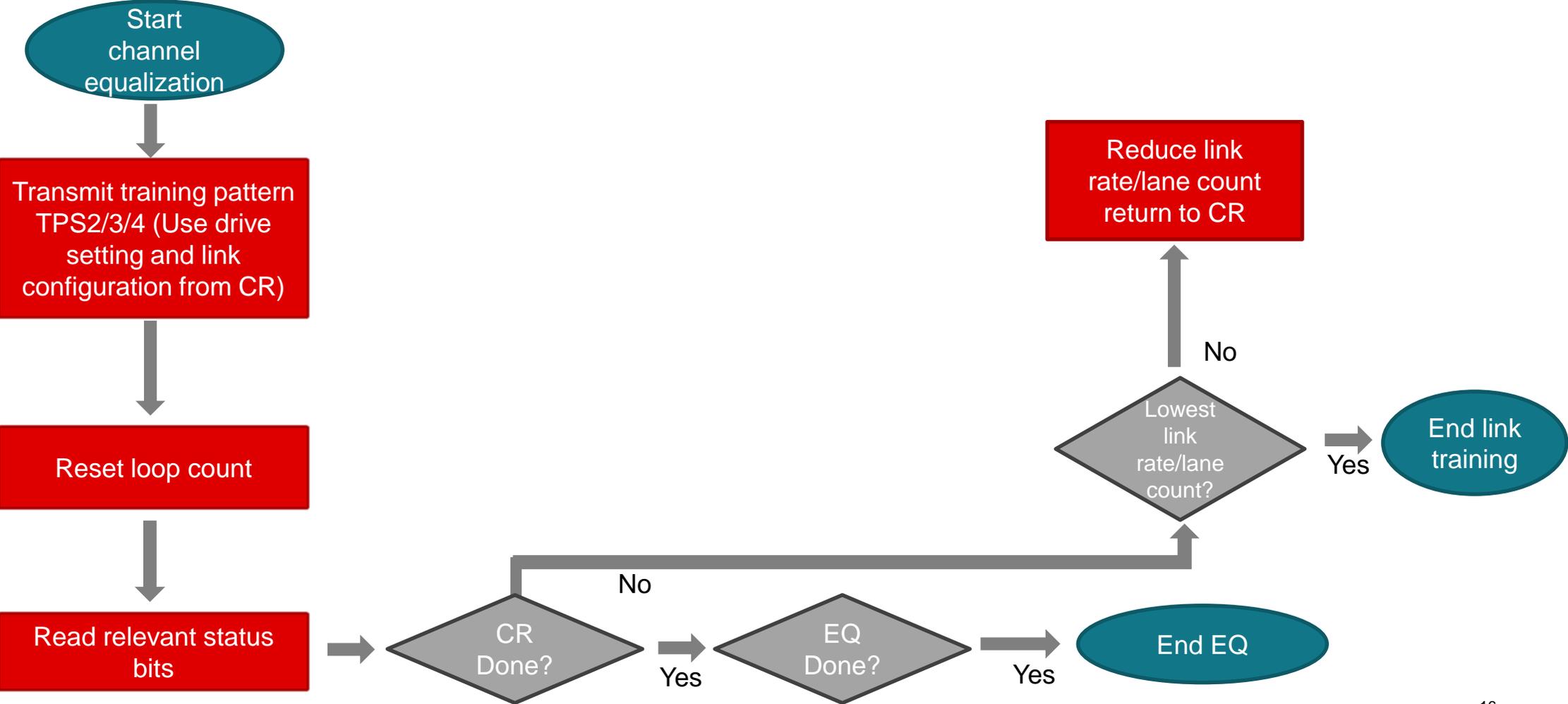
# Channel equalization sequence step 1



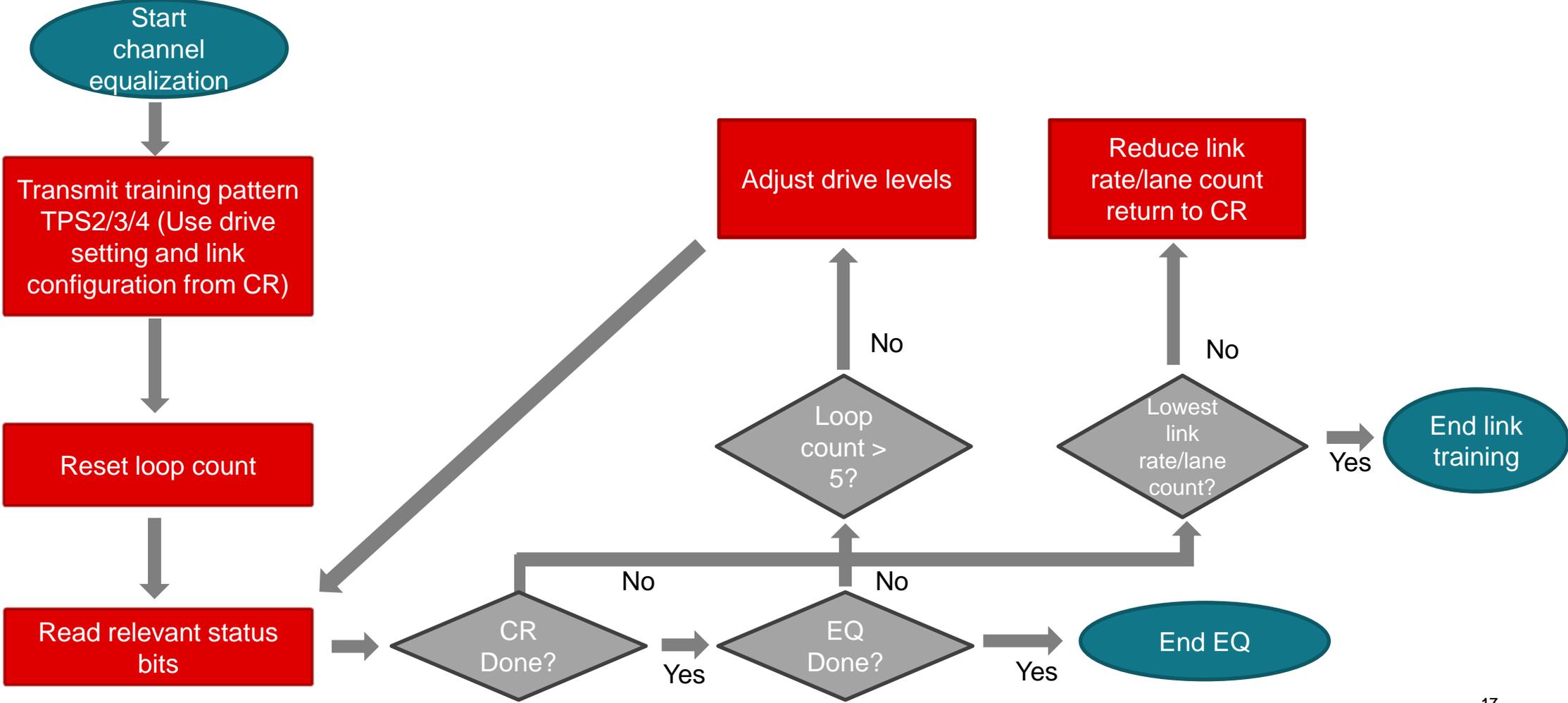
# Channel equalization sequence step 2



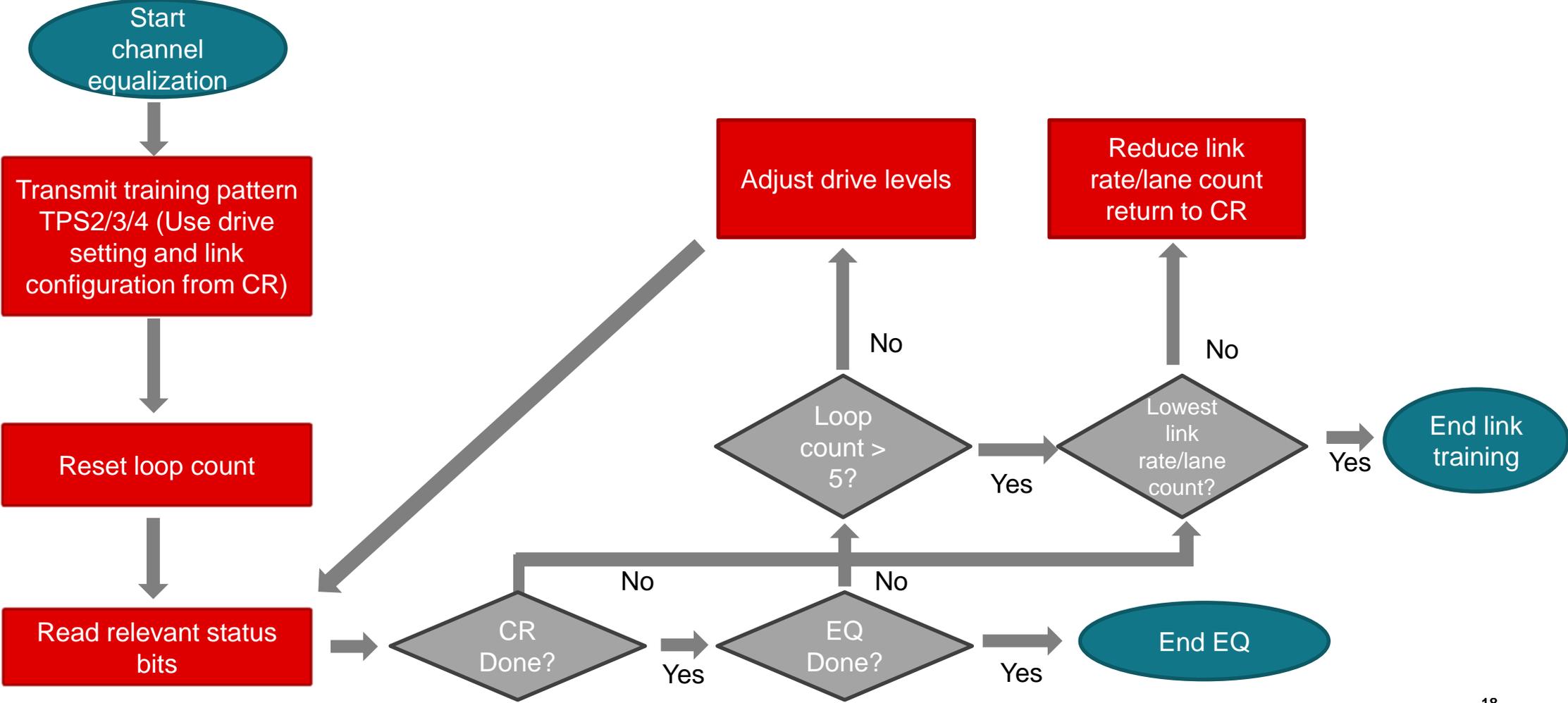
# Channel equalization sequence step 3



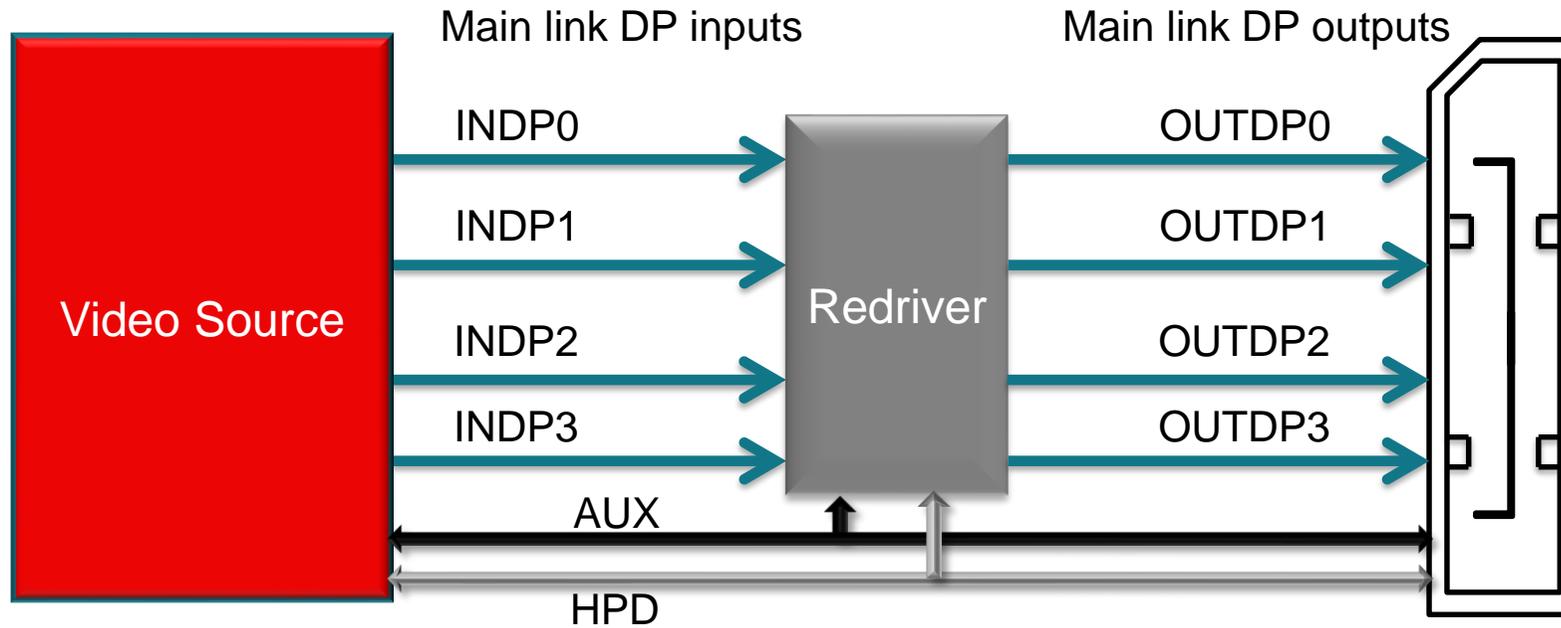
# Channel equalization sequence step 4



# Channel equalization sequence step 5



# Use channel equalization to tune the redrive equalizer



# Thank you

- [TI Precision Labs - What is DisplayPort](#)
- [TI Precision Labs - What is a signal conditioner](#)
- [TI Precision Labs - What is the difference between linear and limited-redriver](#)

The screenshot shows the homepage of the Texas Instruments E2E support forums. At the top left is the Texas Instruments logo. To the right of the logo is the text "TEXAS INSTRUMENTS". In the top right corner, there are links for "Login / Register". Below the logo and navigation links is a red navigation bar with the text "E2E™ support forums > Forums Technical articles TI training Getting started" and a globe icon with the text "简体中文". The main content area has a white background with the heading "Welcome to the TI E2E™ support forums". Below the heading is a paragraph: "TI E2E support forums are an engineer's go-to source for help throughout every step of the design process. Our engineers answer your technical questions and share their knowledge to help you quickly solve your design issues." Below this is a large blue banner with a network diagram background and a large magnifying glass icon. The banner contains the text "Start by searching thousands of existing answers to see if the solution to your problem is already online." and a search input field with the placeholder text "Search TI E2E by part number and/or keyword. (e.g. OPA333 output peaking)". Below the search field are two statistics: "2,270 Contributing TI employees" and "345,592 Issues resolved".



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# Short quiz

True or false: The DisplayPort main link is used to communicate the DP control and status information.

# Short quiz

**FALSE**

True or false: The DisplayPort main link is used to communicate the DP control and status information.

**False.** The DP control and status information is communicated using the AUX interface.

# Short quiz

True or false: DP link training consists clock recovery and channel equalization sequence.

## Short quiz



True or false: DP link training consists clock recovery and channel equalization sequence.

**True.** The link training consists clock recovery and channel equalization sequence. The clock recovery will be completed first and then the channel equalization sequence will start.

# Short quiz

True or false: TPS1 pattern is transmitted during the channel equalization sequence.

## Short quiz

**FALSE**

True or false: TPS1 pattern is transmitted during the channel equalization sequence.

**False.** TPS2, 3, or 4 pattern is transmitted during the channel equalization sequence.

# Short quiz

True or false: A redriver or retimer does not help with the DP main link signal integrity.

## Short quiz

**FALSE**

True or false: A redriver or retimer does not help with the DP main link signal integrity.

**False.** A redriver or retimer does help to improve the main link signal integrity.