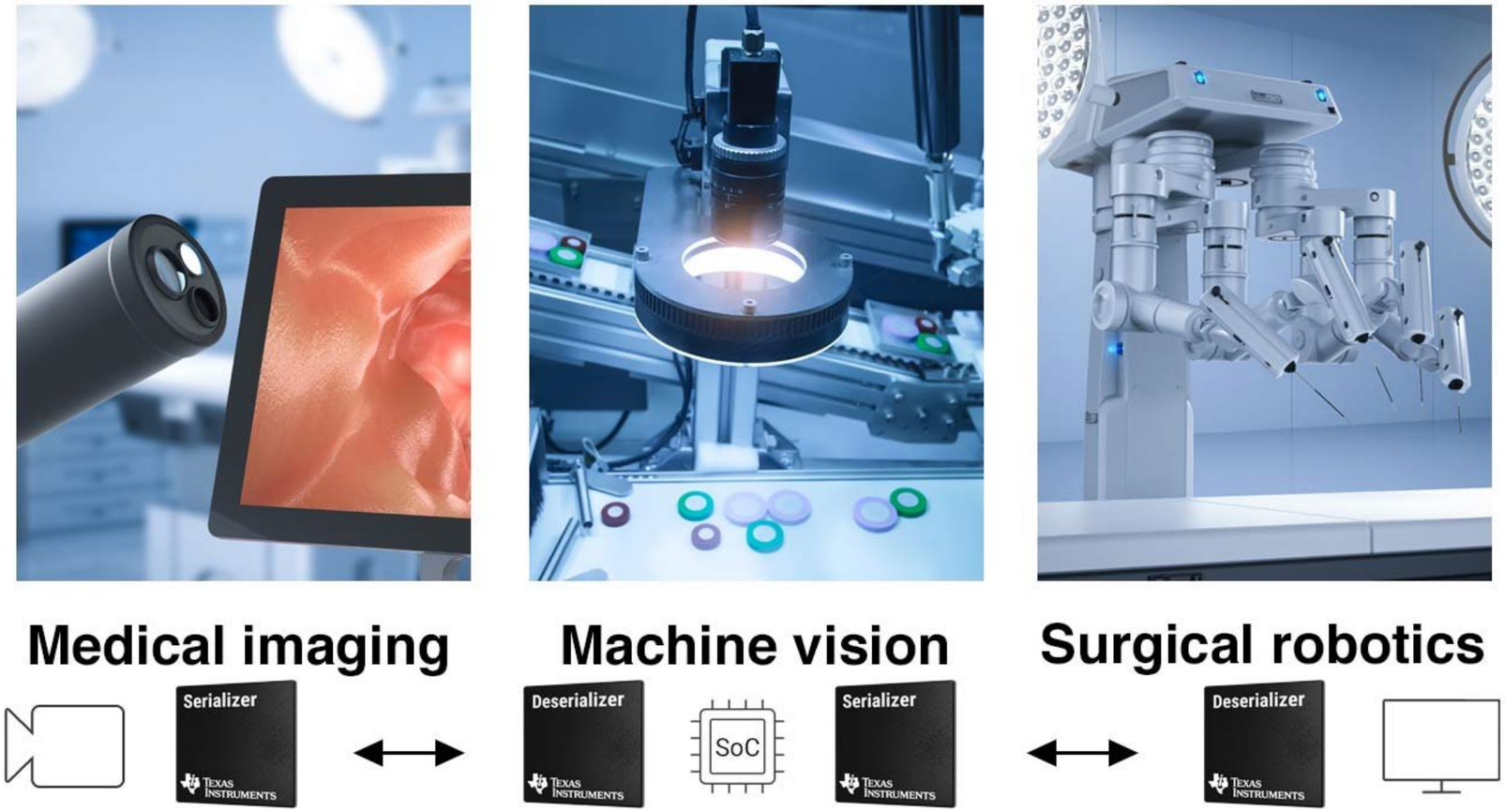
What is V³Link™?

TI Precision Labs – V³Link

Prepared and presented by Casey McCrea

What is V³Link?

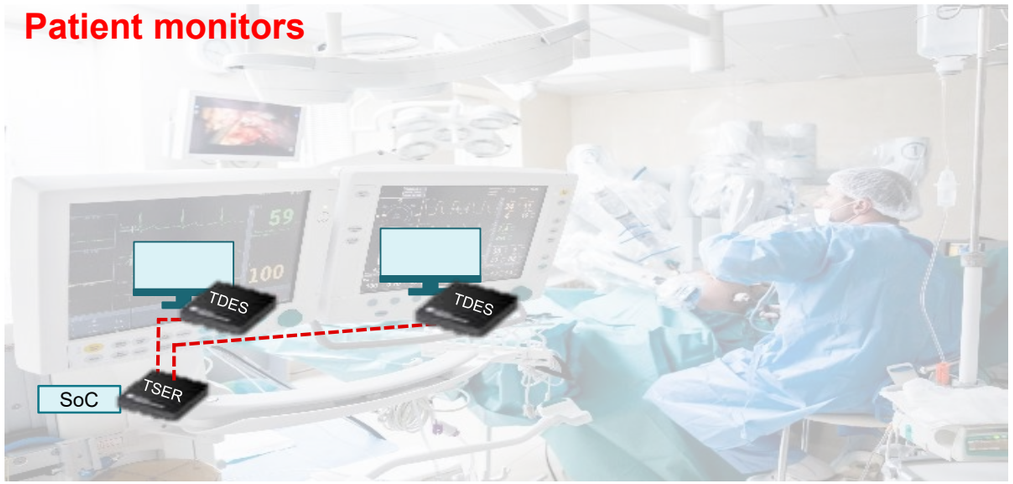


V³Link high-speed bidirectional video serializer/deserializer (SerDes) technology enables uncompressed transmission of video data, control signals and power using a single wire.

Where is V³Link used?

Display SerDes examples

Patient monitors

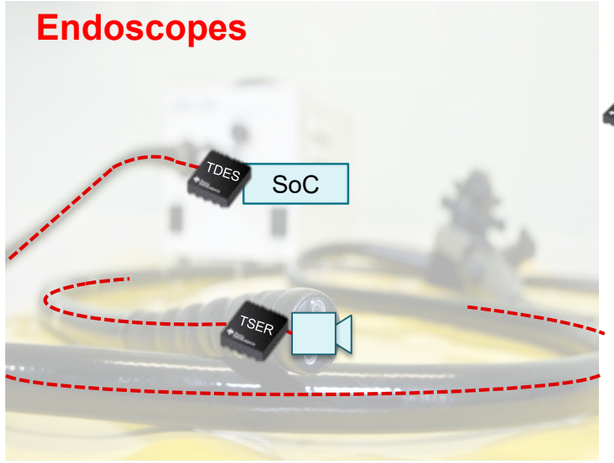


Consumer electronics

Human-machine interface

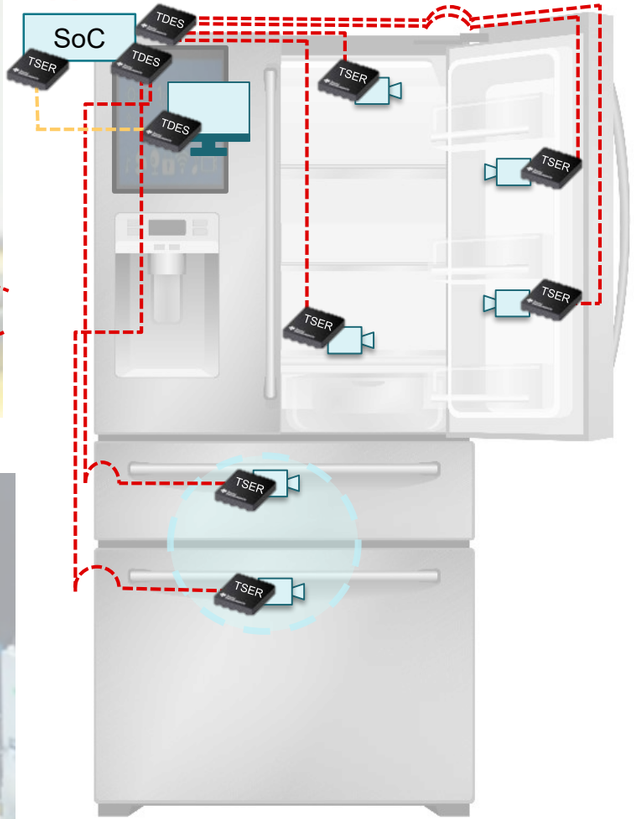
Sensor SerDes examples

Endoscopes



Machine vision

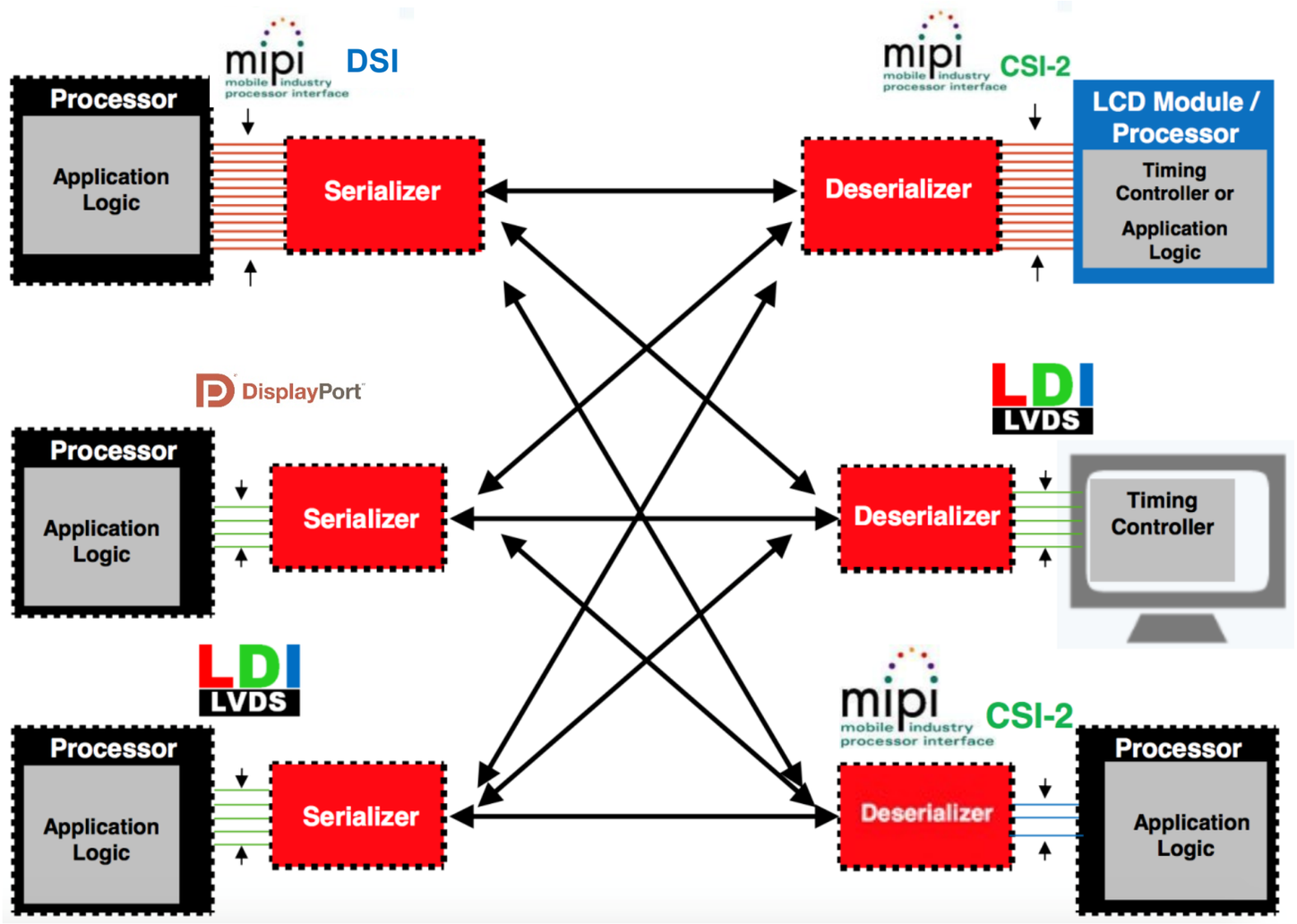
Appliances



Support many data interface standards

Supported standards include:

- HDMI®
- LVDS
- MIPI CSI-2®
- MIPI DSI ®



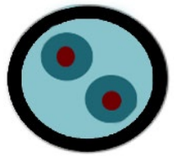
Design flexibility with various cable types

Coaxial cable

- Single-ended signal
- Lower insertion loss
- Lower cost

Shielded-twisted pair (STP)

- One differential pair
- Stronger immunity to EMI



Unshielded-twisted pair (UTP)

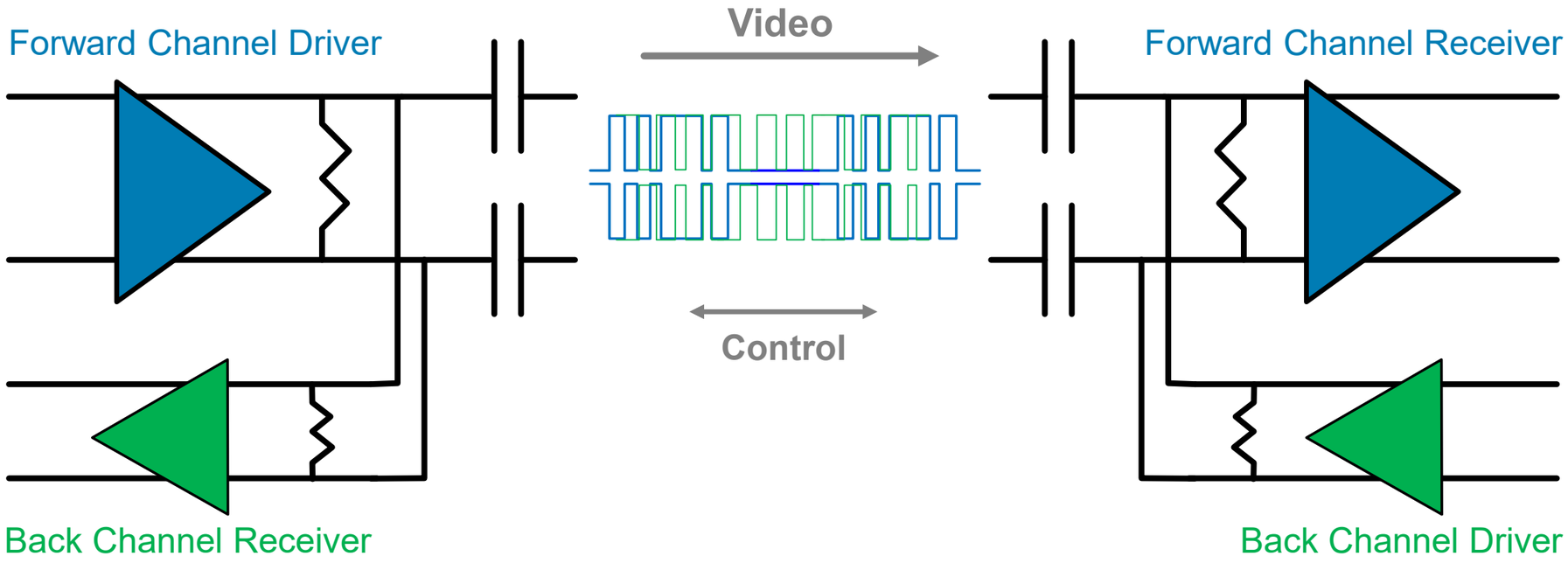
- One differential pair
- Lower cost

Star-quad cable (STQ)

- Two differential pairs
- Stronger immunity to EMI

Enable full duplex communication

Forward-and-back channel



Forward channel:

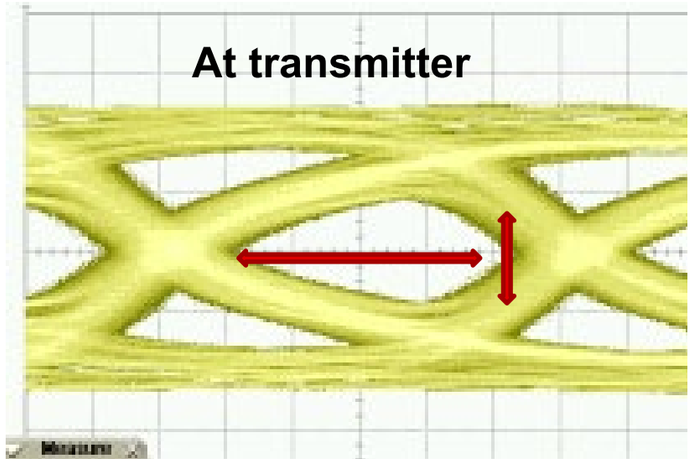
- Serializer → deserializer
- High-speed data transmission
- Provide video payload data, I²C/SPI/GPIO data, and info on link diagnostics to deserializer

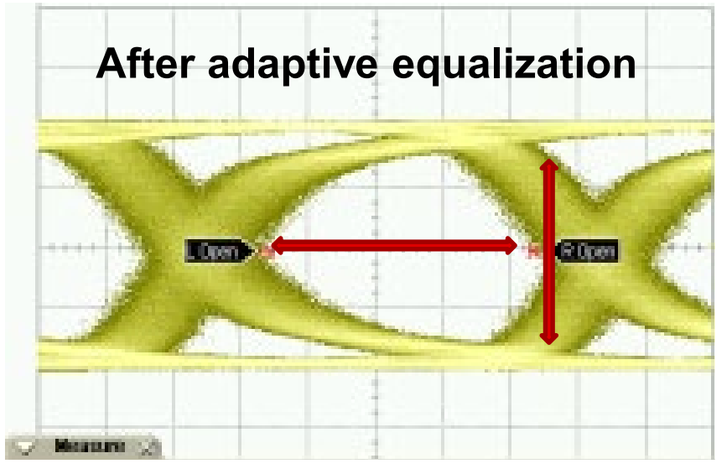
Back channel:

- Deserializer → serializer
- Low-speed data transmission
- Provide CLK for forward-channel line rate
- Provide I²C, GPIO and SPI info to serializer

Compensate for channel insertion loss

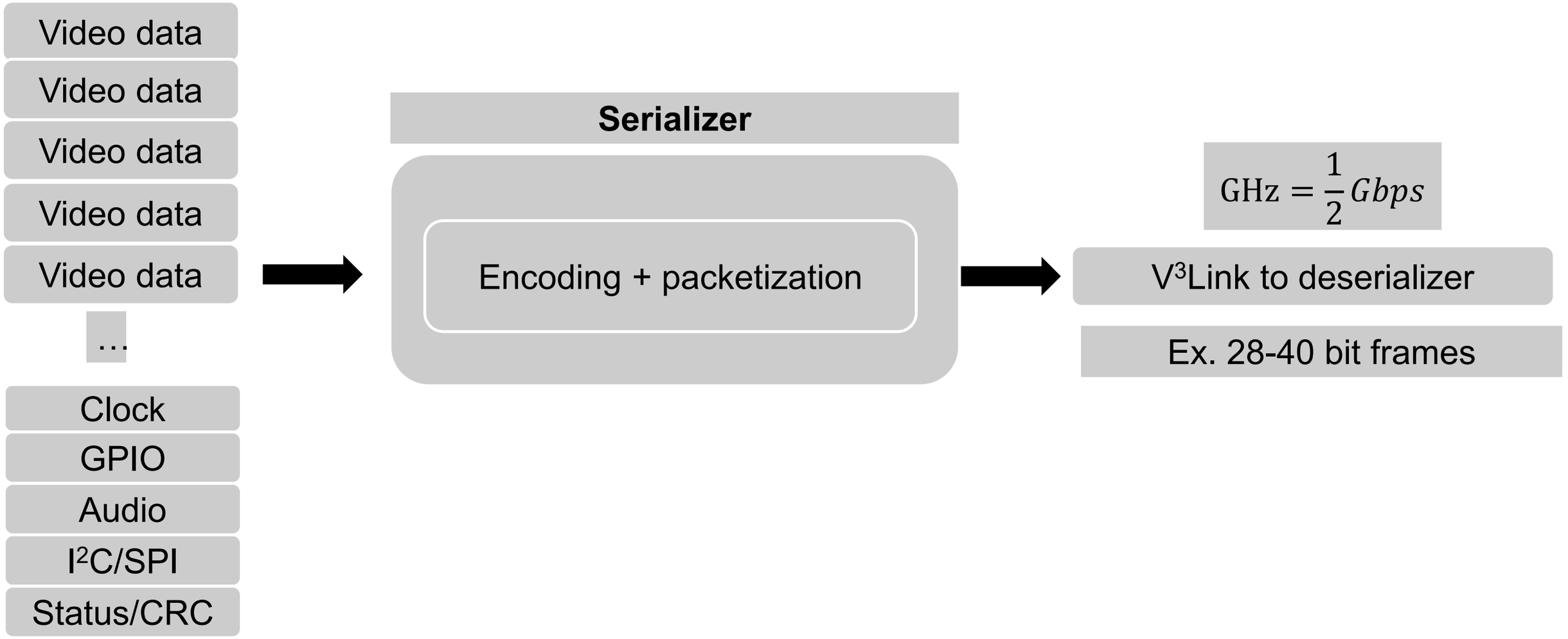
Adaptive equalization (AEQ)



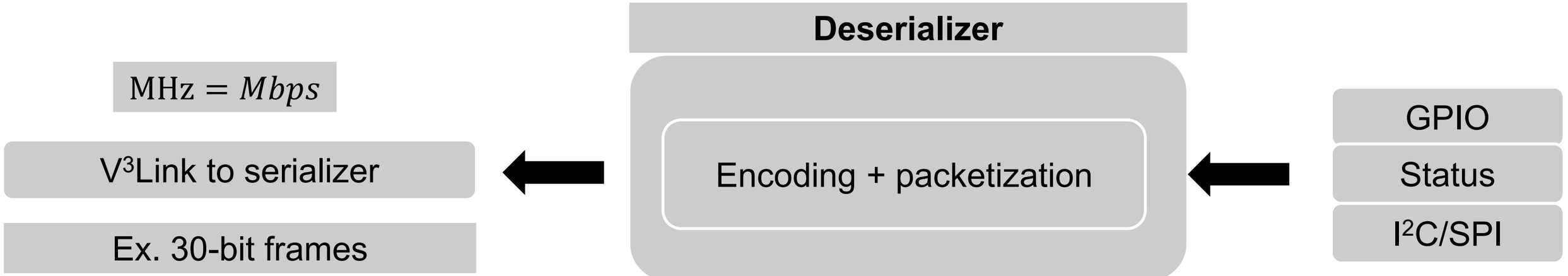


- Compensates cable loss and signal degradation
  - Continuous time linear equalizer (CTLE)
  - Clock domain recovery (CDR)
- Continuously and automatically adapts to cable aging, temperature effects, and changing electromagnetic environments.

How forward-channel serialization works



How back-channel communication works



Quiz

1. For an V^{3}Link forward-channel frequency of 4.16 Gbps per lane, what is the fundamental carrier frequency for the signal per lane?
   a) 4.16 GHz
   b) 104 MHz
   ✓ c) 2.08 GHz
   d) 6.72 GHz
2. For an V^{3}Link back-channel rate of 50 Mbps, what is the fundamental carrier frequency for the signal?
   a) 10 MHz
   ✓ b) 50 MHz
   c) 5 MHz
   d) 25 MHz
3. True or false?
   – V^{3}Link is a bidirectional half-duplex protocol

FALSE

Thank you

- V^{3}Link technical resources
- TI V^{3}Link products
- www.ti.com/interface/high-speed-serdes/V3Link-serdes/products

TEXAS INSTRUMENTS