Copper Cable Terminology

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Terminology

- Goal: Align on the terminology to enable effective communication during foundational discussions in the 3df Task Force

- Full Active = redriver or retimer on Tx/Rx of both ends

- Half Active = redriver or retimer on Rx (to host) of both ends

- Asymmetric Half Active = redriver or retimer on Tx/Rx of one end

Background

- Not all copper cables are passive copper cables
  - Non-passive copper cables contain active elements in the transmit and/or receive path within the cable assembly
- Cartoon pictures of cable plug ends in this presentation are intended to generically represent one of the common form factors: SFP, SFP-DD, DSFP, QSFP, QSFP-DD, OSFP, etc.
- Different types of cables address different industry usage models

- This presentation does not address:
  - Nomenclature for, nor advocate for/against, "Active optical cables" or "AOCs"
  - Cables with "gearbox" inside
- Talk to Kent offline if you have inputs!

Passive Copper Cable
(Direct Attach Copper / DAC)
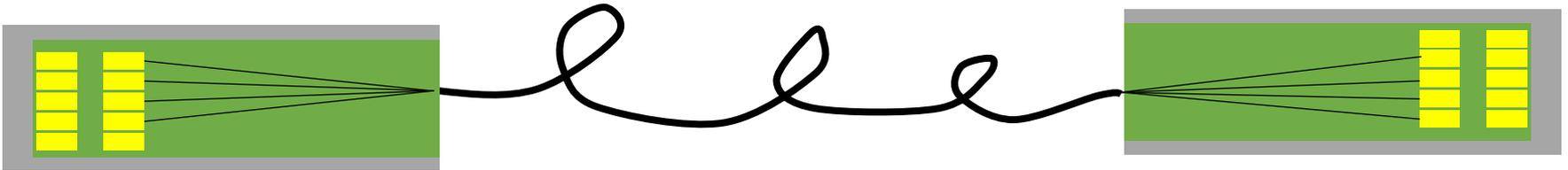
Not drawn to scale

- Passive
  - Each plug end is passive
- Host interface is a "CR" PMD

Full Active Electrical Cable (AEC)
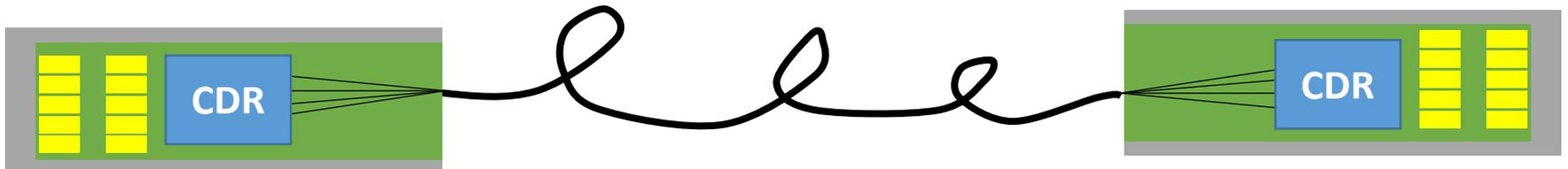
Fully Retimed = Active Electrical Cable (AEC)

- Fully Retimed
  - Each plug end contains a CDR device that retimes the incoming <u>and</u> outgoing signal
- Host interface could be an AUI

Half Active Electrical Cable (AEC)
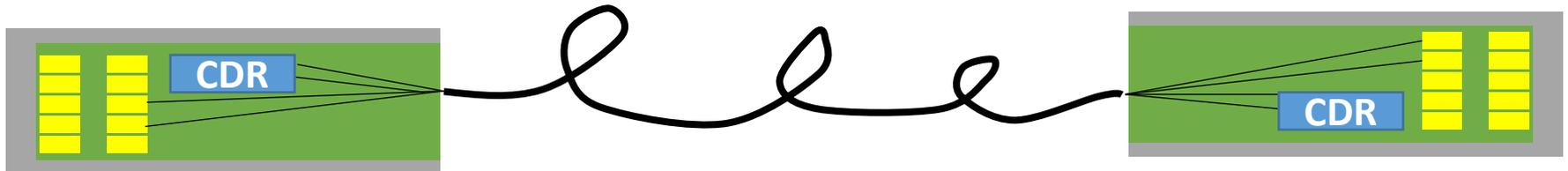

(Symmetric) Half Active Electrical Cable (AEC)
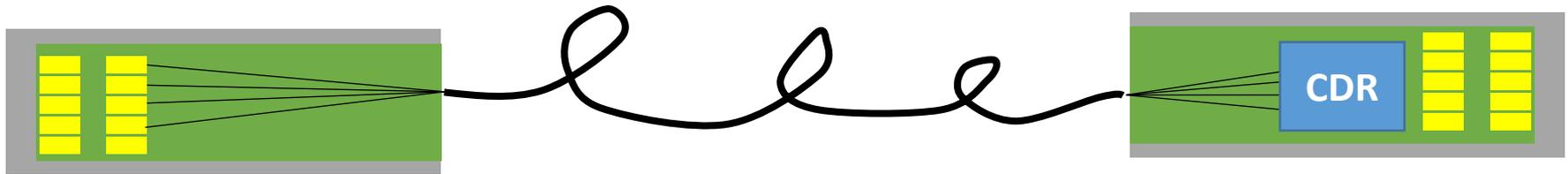
Asymmetric Half Active Electrical Cable (AEC)

- Half Active Electrical Cable has two approaches
  - Symmetric: Each plug end contains a "half" CDR device that retimes the RX (outgoing to host) signal
    - Incoming (from host) retiming is possible but not common
  - Asymmetric: One plug end contains a full CDR that retimes the incoming <u>and</u> outgoing signal

Non-retimed Active Copper Cable (ACC)
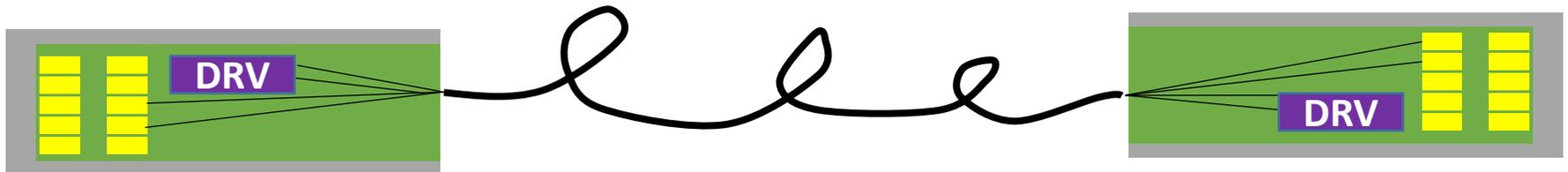
(Symmetric) Active Copper Cable (ACC)
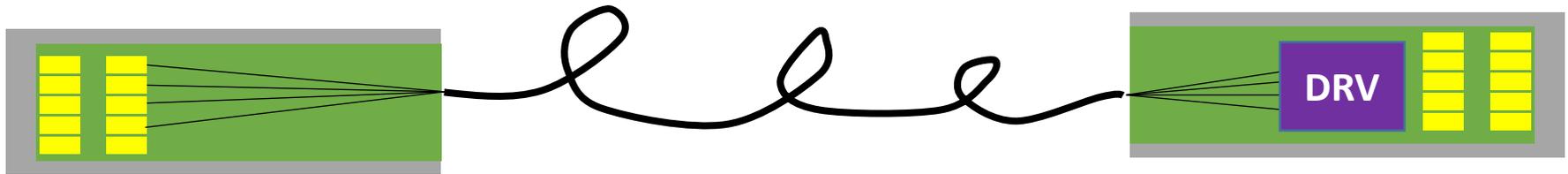
Asymmetric Half Active Copper Cable (ACC)

- Non-Retimed
  - Each plug end contains a half linear redriver that equalizes the RX (outgoing to host) signal
  - One plug end contains a linear redriver that equalizes the incoming and outgoing signal
  - Full active linear (that redrive on both TX and RX on each end) are not common
- Host interface could be a "CR"-like PMD

THANKS!

Additional Information

- https://www.intel.com/content/www/us/en/io/serial-bus-white-paper.html