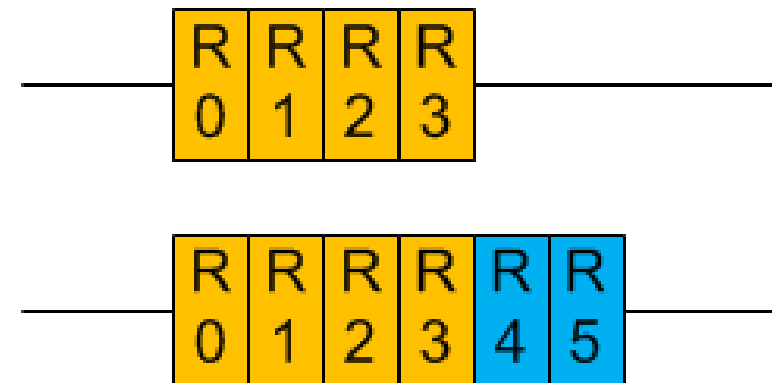# 40G EEE Proposal

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15 July 2014

# 40G EEE Overview

- Clone 10G EEE

- Adjust Sleep and Refresh lengths

- Provide mechanism for the receiver to request the transmitter to leave LPI mode

# Increase Refresh length

- 10G max cable length = 100m
- Now the max cable length = 30m
- In 10G all of the TX Refresh was needed to adapt echo cancellation well
- Now the cable is affectively 20% longer (4 * 30 = 120m)
- Increase Refresh from 4 to 5 to deal with this effectively longer echo
- Add an additional LDPC frame to reduce adaptation capture precision requirements
- Total Refresh = 6 LDPC frames
- Ref/QRef$_{Per}$ now is 85 instead of 128

| R 0 | R 1 | R 2 | R 3 |
|-----|-----|-----|-----|

| R 0 | R 1 | R 2 | R 3 | R 4 | R 5 |
|-----|-----|-----|-----|-----|-----|

# Reduce Sleep length

- 10G LPI requires 9 frames of sleep be sent prior to entering LPI mode
- The receiver detects this after LDPC decoding and prepares its circuits for LPI mode
- 6 Sleep frames are enough to prepare for LPI mode
- This reduces the Case 1 latency in Table 78-4 from 23 frames (1.84us) to 20 frames (1.6us)

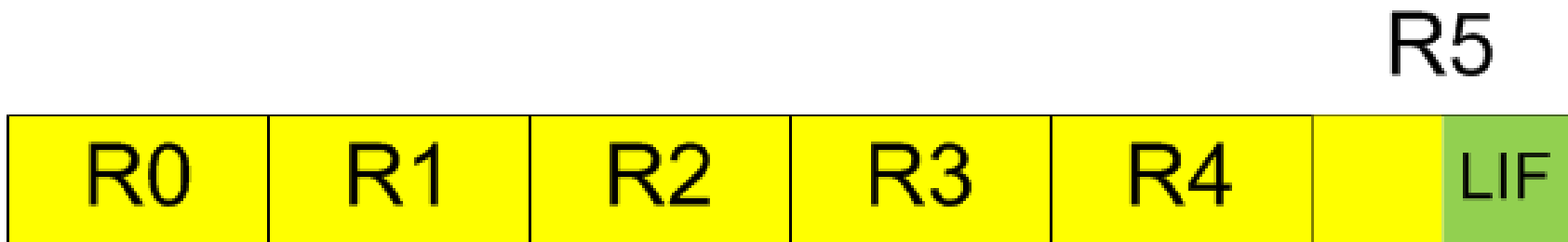# Signal link partner (LP) to leave LPI mode - pt 1/2

- A change in environment to an extreme operating point can stress the receiver during symmetrical LPI mode
- The receiver can recover if the LP transmitter transitions to Normal mode for a finite period
- The 10G EEE standard has no mechanism to tell the transmitter to leave LPI mode at the PHY level without involving higher layers
- Propose we use a back channel method to tell the LP transmitter to leave LPI mode temporarily
- The higher layers will be oblivious to this action

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- Propose the last 128 symbols of Refresh be reserved for LPI back channel
- Use the same mechanism used to generate InfoFields as shown in Figure 55–13
- The back channel data should be general purpose allowing other information to be sent
- Disable LPI time should be in units of minutes
- Disable LPI time limited to 20 minutes in length

R5

| R0 | R1 | R2 | R3 | R4 | LIF |
|----|----|----|----|----|-----|

# Proposals

- Proposal 1: Increase Refresh length. Change "lpi_refresh_time equal to 4" in 98.3.5 to "lpi_refresh_time equal to 6". Make subsequent references to LPI Refresh consistent with this change.

- Proposal 2: Decrease Sleep length. Change "then it contains 9 full LDPC frames" in 98.3.2.2.22 EEE capability to "then it contains 6 full LDPC frames". Make other references to Sleep to be consistent with this change.