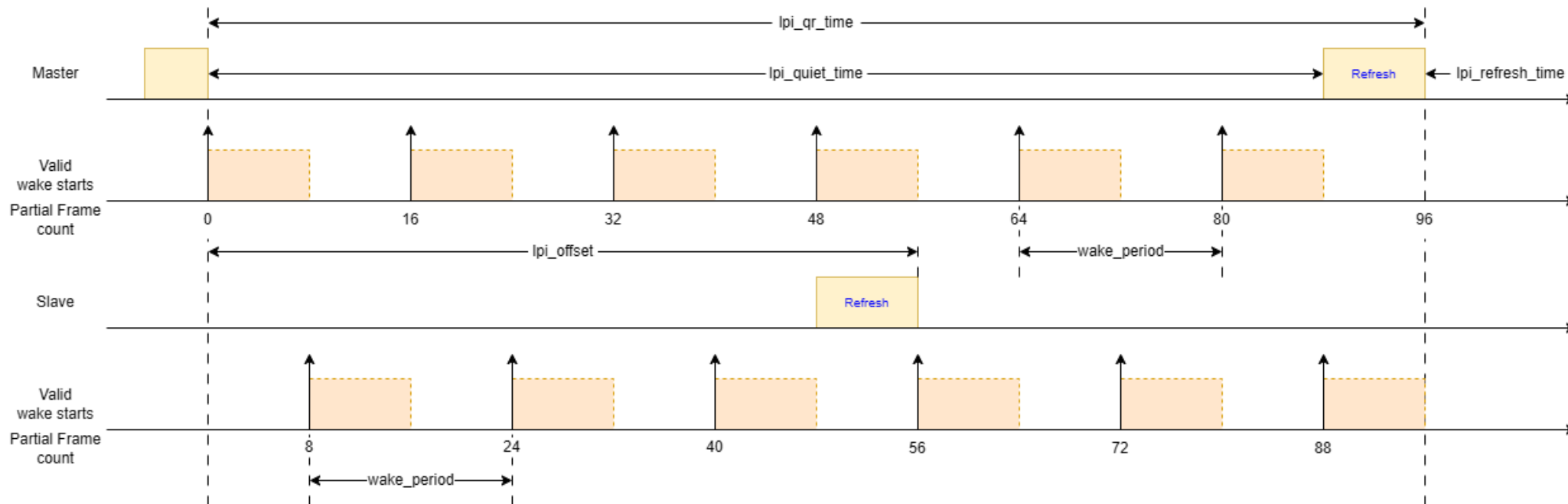


# Proposals to Adopt for the PCS for 100BASE-T1L - EEE and OAM

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# Proposal for PCS for 100BASE-T1L PHY: EEE Capability

- ▶ EEE abilities advertised in InfoField (EEEEn and LPIEn bits in PHY Capability)
  - LPI only entered when both link partners indicate EEEEn = 1 and LPIEn = 1
  - If EEEEn = 1 and LPIEn = 0, PCS encoding transparently carries the LPI signalling MII to MII, but the PHY does not enter LPI quiet-refresh cycle
  - If EEEEn = 0, LPI is encoded as a normal inter frame (Idle), and decoded as error
- ▶ LPI consists of alternating quiet and refresh periods
- ▶ Each direction of the link can enter and exit LPI mode independently



# Proposal for PCS for 100BASE-T1L PHY: LPI Synchronization and Signalling

## ► LPI synchronization

- Quiet-refresh cycle established from the master partial frame count (PFC24)
  - Slave PHY shall synchronize its PFC24 to the master's during training

| Variable          | Master  | Slave   |
|-------------------|---|---|
| tx_refresh_active | $\text{lpi\_quiet\_time} \leq \text{mod}(\text{PFC24}, \text{lpi\_qr\_time})$ | $\text{lpi\_offset} - \text{lpi\_refresh\_time} \leq \text{mod}(\text{PFC24}, \text{lpi\_qr\_time}) < \text{lpi\_offset}$ |
| tx_wake_start     | $\text{mod}(\text{PFC24}, \text{wake\_period}) = 0$                           | $\text{mod}(\text{PFC24}, \text{wake\_period}) = \text{wake\_period}/2$   |

## ► LPI signalling

- During quiet periods, the PCS transmitter passes zero ternary symbols to the PMA
- During the staggered out of phase refresh periods, the PCS transmitter operates as in normal mode, with PCS transmit data (tx\_coded) set to zero (or encoded LPI)
  - No PHY health information. Quiet refresh cycle shall be sufficient to ensure PHY SNR
- During wake-up, the PCS transmitter operates as in normal mode, with the PCS transmit data (tx\_coded) containing (8N/8N+1) encoded normal inter-frame symbols
  - No alert signal (same as clause 97)

# Proposal for PCS for 100BASE-T1L PHY: LPI Timing Parameters and Wake-up Time

- ▶ Suggested parameter values, to be updated in actual text

| Parameter        | Number of partial frame periods<br>(*Values may change) | μs    |
|------------------|---|-------|
| lpi_offset       | 56  |       |
| lpi_qr_time      | 96  | 230.4 |
| lpi_quiet_time   | 88  | 211.2 |
| lpi_refresh_time | 8   | 19.2  |
| sleep            | 8   | 19.2  |
| wake_period      | 16  |       |

| lpi_wake_time | Wake starts before sleep is complete |      | Wake starts after sleep is complete |      |
|---------------|--------------------------------------|------|-------------------------------------|------|
|               | Partial frames                       | μs   | Partial frames                      | μs   |
| 8             | 32                                   | 76.8 | 24                                  | 57.6 |

# Proposal for PCS for 100BASE-T1L PHY: OAM

- ▶ OAM is not supported