

The Duration of Ipi_postupdate_timer of EEE 1000BASE-T

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Supporters

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Background

- EEE GPHY (1000BASE-T) supports symmetric LPI. When one link partner enters Quiet state, the other link partner has to follow.
- However, it takes a round trip delay to exchange the state information and maintain the synchronization.
- In Figure 40-15b, a Post_Update state is introduced to avoid the case that one partner exits to Active state while the other partner moves to Quiet state.
- The design goal of the duration of Post_Update state is to be longer than a round trip delay.

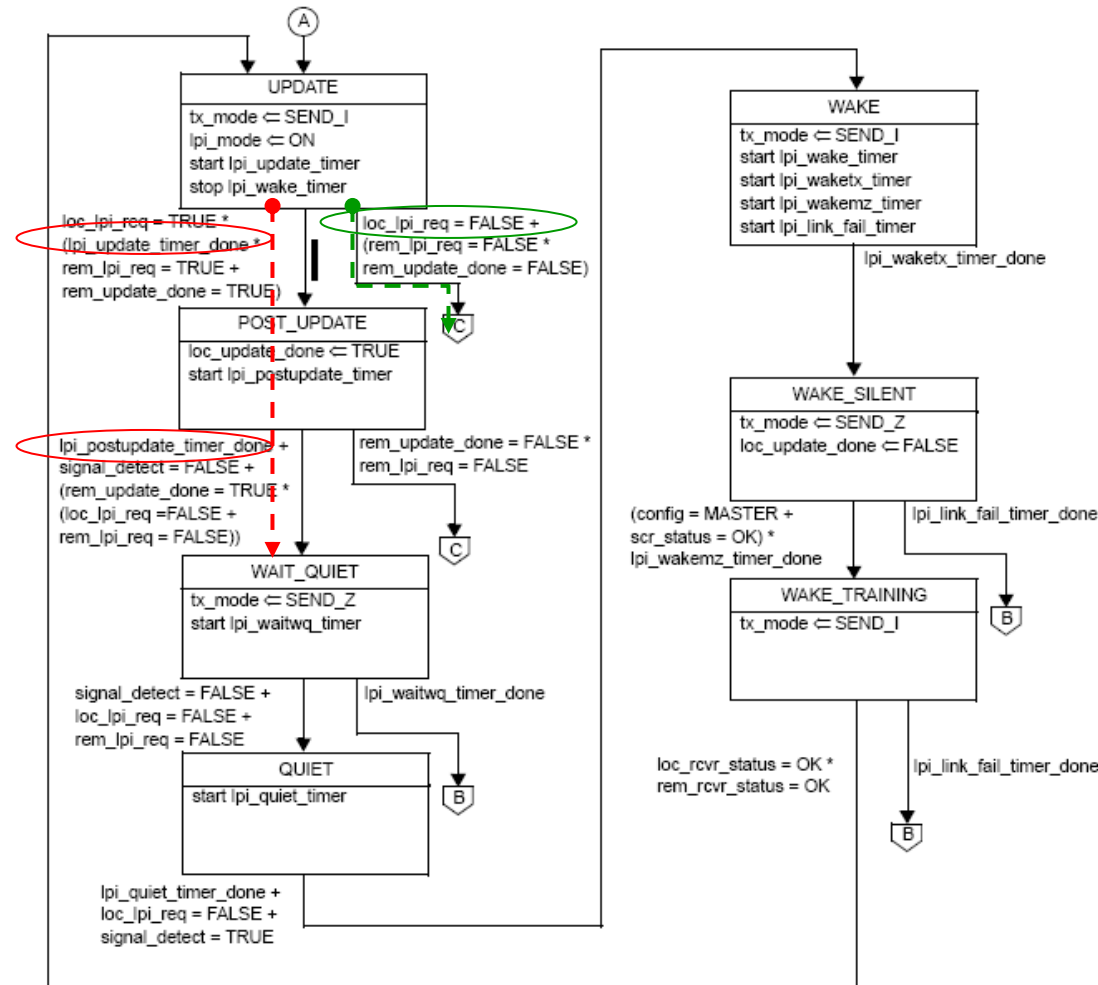
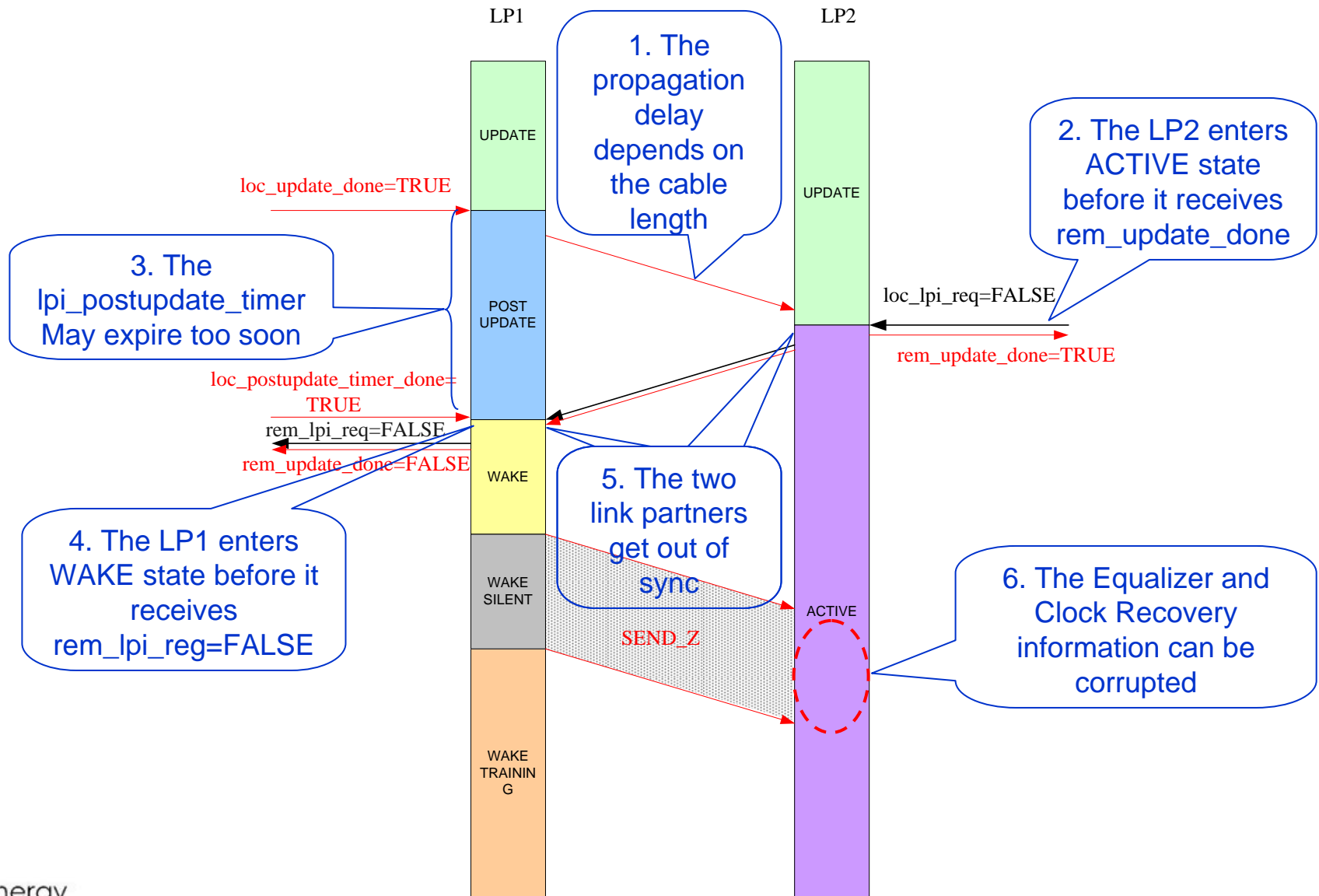


Figure 40-15b—PHY Control state diagram, part b (optional)

The Critical Case illustrated



The case for longer cable

- ❑ The current value of `lpi_postupdate_timer` is defined between $2.0 \mu s$ to $2.2 \mu s$.
- ❑ However, we need $\text{lpi_postupdate_timer} > 2 \times (\text{tx-latency} + \text{rx-latecy} + \text{wire-delay})$

where $\text{tx-latency} \leq 84\text{ns}$ (T_{tcp} , healey_02_0309.pdf, P.5)
 $\text{rx-latency} \leq 244\text{ns}$ (T_{rcp} , healey_02_0309.pdf, P.5)
 $\text{wire-delay (cat5E)} \sim 5.5\text{ns/m} * \text{cable_length}$

- ❑ Therefore, if we pick the max value of `lpi_postupdate_timer` $2.2\mu s$, we will be able to support maximum cable length of $(2200/2 - 84 - 244)/5.5 = 140$ meters
- ❑ It means that, for a field application with cable length equal to or greater than 140 meters, a synchronization failure condition will happen.
- ❑ **Need to increase the value of `lpi_postupdate_timer`.**

The Proposal

- Increase the duration of lpi_postupdate_timer (P.103, L.24)

- **lpi_postupdate_timer**

This timer defines the maximum time the PHY dwells in the POST_UPDATE state before proceeding to the WAIT_QUIET state.

Values: The condition lpi_postupdate_timer_done becomes true upon timer expiration.

Duration: This timer shall have a period between **2.5 μ s and 3.0 μ s**. Parameters are modified in Table 78-4: Summary of the LPI timing parameters for supported PHYs

- The maximal PHY wake time Tw_phy (16.5 μ s) is not affected by the change of this timer.
=> **No penalty**

Thank you!