

IEEE P802.3az/D1.1 Clause 24 Receive State Diagram Corner Case Analysis

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IEEE P802.3az Task Force
New Orleans, January 2009



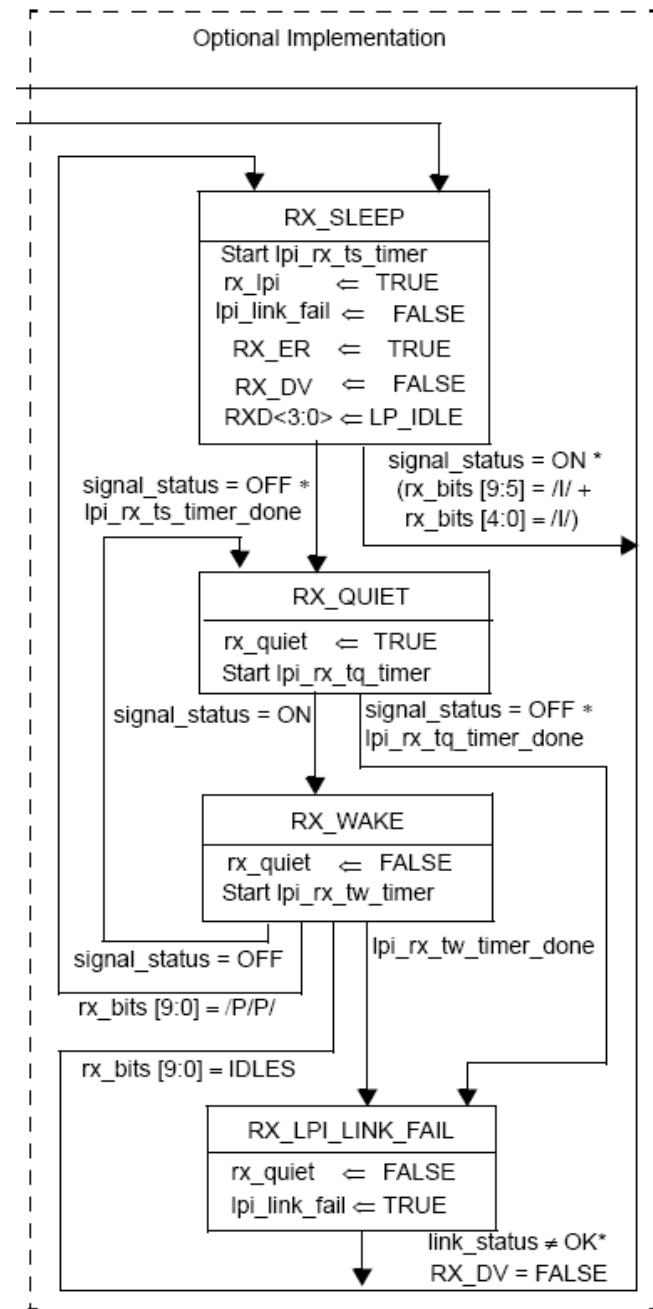
Overview

- The Clause 24 Receive State Diagram has a corner case condition in which under certain degenerate signal status conditions, it is possible to indefinitely transition back and forth between RX_QUIET and RX_WAKE, without ever transitioning to RX_LPI_LINK_FAIL .
- This presentation illustrates this corner case and proposes a modification to the Receive State Diagram to avoid it.



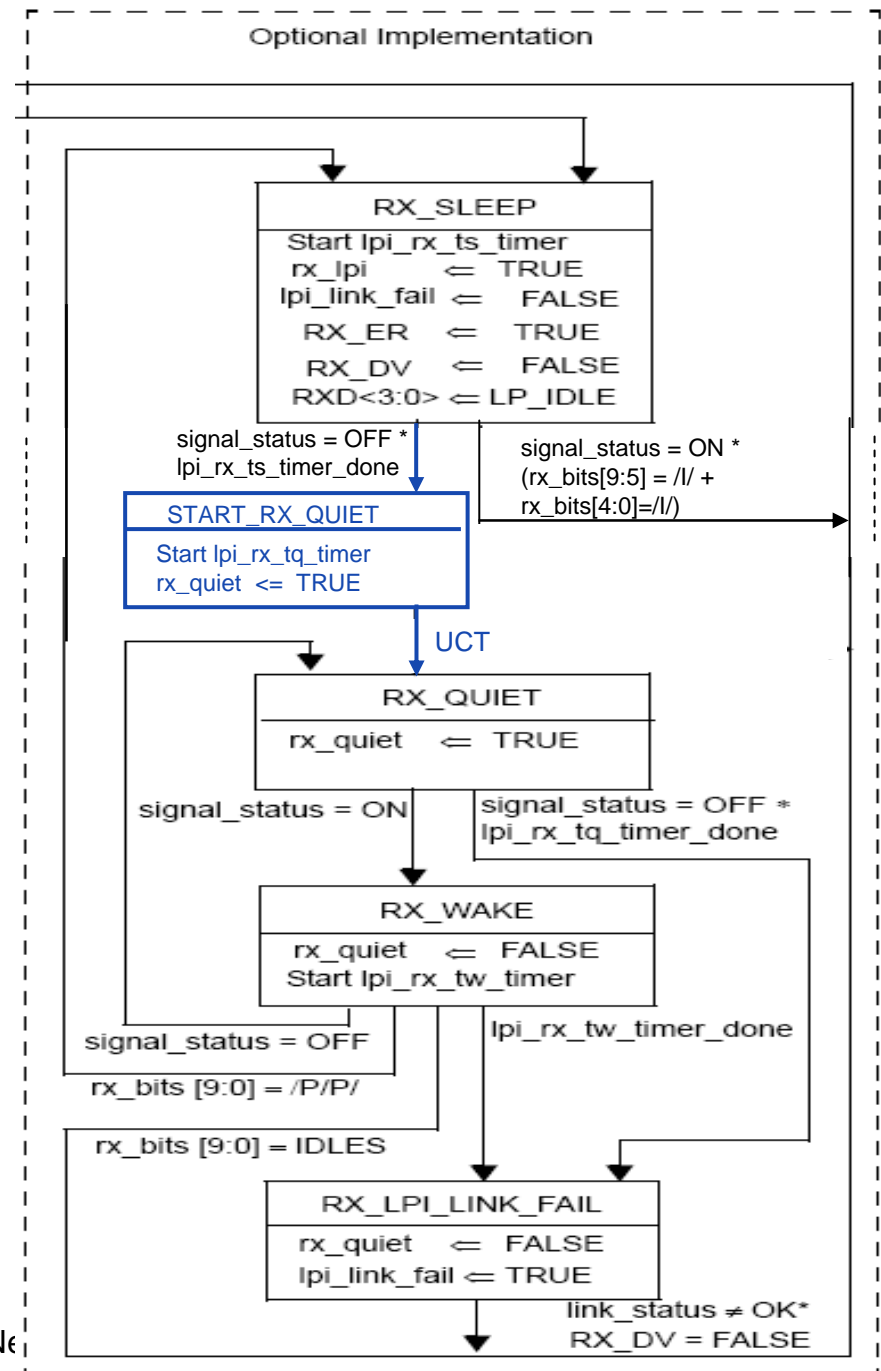
Clause 24 Receive State Diagram

- Corner-case condition can occur if signal_status toggles between ON and OFF with the following sequence and associated states:
 1. State is RX_QUIET and signal_status toggles to ON.
 2. State transitions to RX_WAKE and lpi_rx_tw_timer is reset.
 3. signal_status toggles to OFF prior to lpi_rx_tw_timer expiring causing a transition back to RX_QUIET, causing lpi_rx_tq_timer to be reset.
 4. Prior to lpi_rx_tq_timer expiring, signal_status toggles to ON (2 through 4 can then repeat indefinitely).



Proposed Change to Clause 24 Receive State Diagram

- Add state START_RX_QUIET to reset lpi_rx_tq_timer once at the beginning of each quiet period.
- This is equivalent to the existing state diagram except that lpi_rx_tq_timer is not reset upon re-entry to the RX_QUIET state.



Conclusions

- The Clause 24 Receive State Diagram has a corner case condition in which it is possible to indefinitely transition back and forth between RX_QUIET and RX_WAKE, without ever transitioning to RX_LPI_LINK_FAIL .
- Introducing a new state, START_RX_QUIET allows for the lpi_rx_tq_timer to be started without the possibility of being reset by transitions from RX_WAKE to RX_QUIET.
- This ensures that if a link failure occurs it will be detected and the appropriate state transition will occur at most after the lpi_rx_tq_timer period.



Thank you

