Proposed changes to the 1000BASE-X PCS Receive state diagram

Jacobo Riesco and Adam Healey
LSI Corporation
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Introduction

This proposal is intended to address IEEE P802.3az/Draft 2.1 comments #14, #139, #147, #148, and #149. The proposed state diagram merges the existing LPI Receive state diagram (Figure 36-9a) with the PCS Receive state diagram (Figure 36-7). Figure 36-9a is removed. Modifications to the original PCS Receive state diagram (Figure 36-7a) are minimized to more clearly delineate supplemental requirements for the optional Energy Efficient Ethernet capability.

Specifically, the aliases detect_idle and detect_lpidle are removed due to the issues cited in comment #147. Also, the state diagram gracefully handles transitions from low power idle to Auto-Negotiation (refer to comments #14 and #149).

Problem description

Refer to IEEE P802.3az/Draft 2.1 comments #14, #139, #147, #148, and #149.

There was another issue with the state diagram that was observed after the comment deadline. The condition detect_idle * ODD could become true at the receiver when the transmitter ceases transmission (for example, an entire code-group is not received). As currently specified, detect_idle will be set to true on any received code-group that is not /D21.5/, /D2.2/, /D26.4/, or /D6.5/. This condition could be satisfied by a truncated code-group. This would cause a transition from RX_SLEEP to RX_ACTIVE instead of RX_QUIET which would eventually result in link failure.

Description of proposed changes

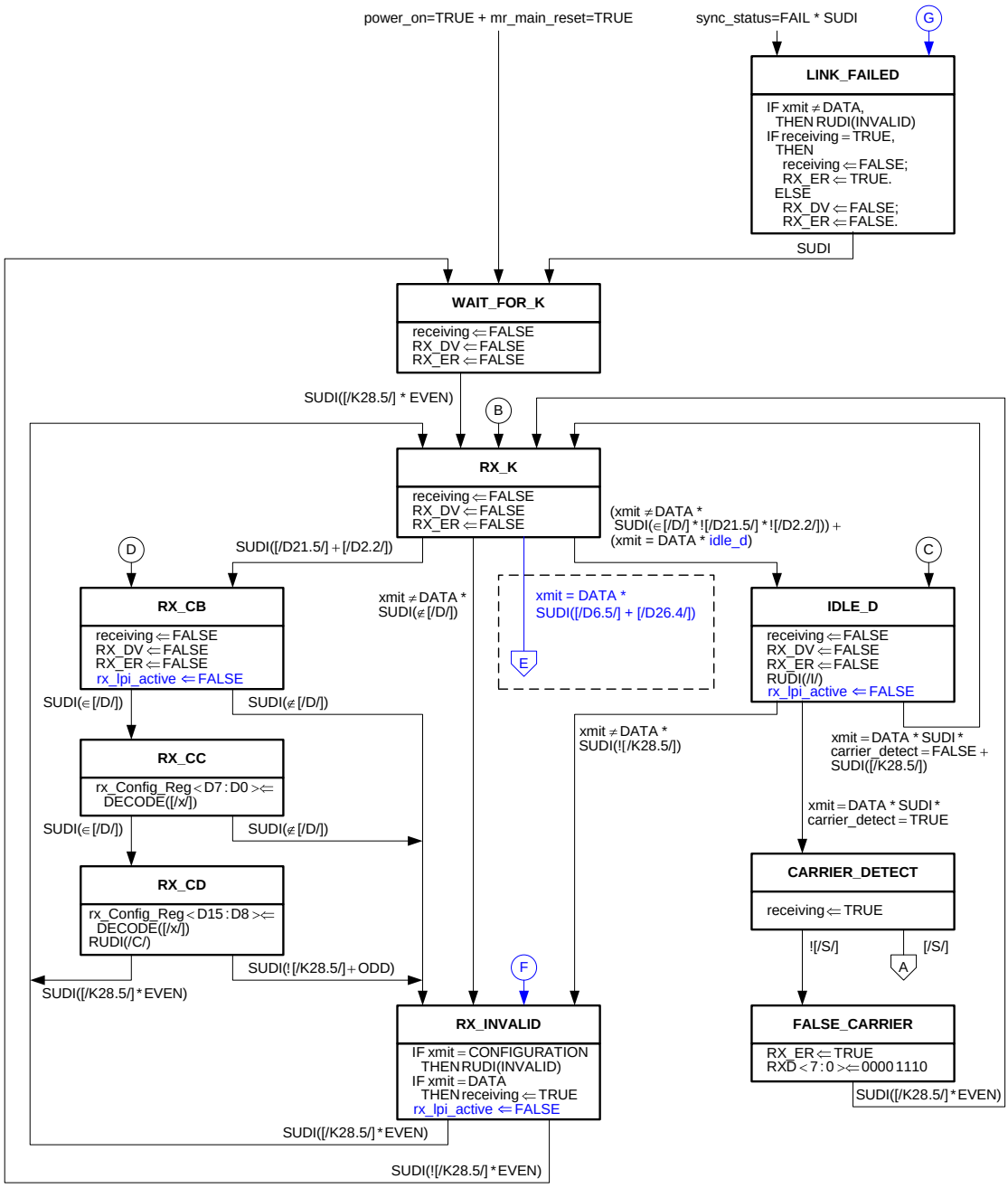
The sync_status variable is re-defined so that it is set to TRUE when either code_sync_status = OK or rx_lpi_active is TRUE and is set to FALSE otherwise.

Remove aliases detect_idle and detect_lpidle.

A new alias idle_d is defined to be SUDI(![/D21.5/]*![/D2.2/]). When the optional EEE capability is supported, the alternate definition SUDI(![/D21.5/]*![/D2.2/]*![/D6.5/]*![/D26.4/]) is used.

A new timer, rx_ts_timer, has been introduced to time-out the “sleep” period. Note that code_sync_status is (and has to be) ignored in those states, as synchronization could be lost when the line goes quiet. Its value, T_{SR} should be slightly larger than the transmit sleep timer value, T_{SL} (20 μs). This is similar to the approach taken in the 100BASE-TX Receive state diagram. The proposed range for T_{SR} is 22 to 24 μs.

Replace Figure 36–7a with the following:

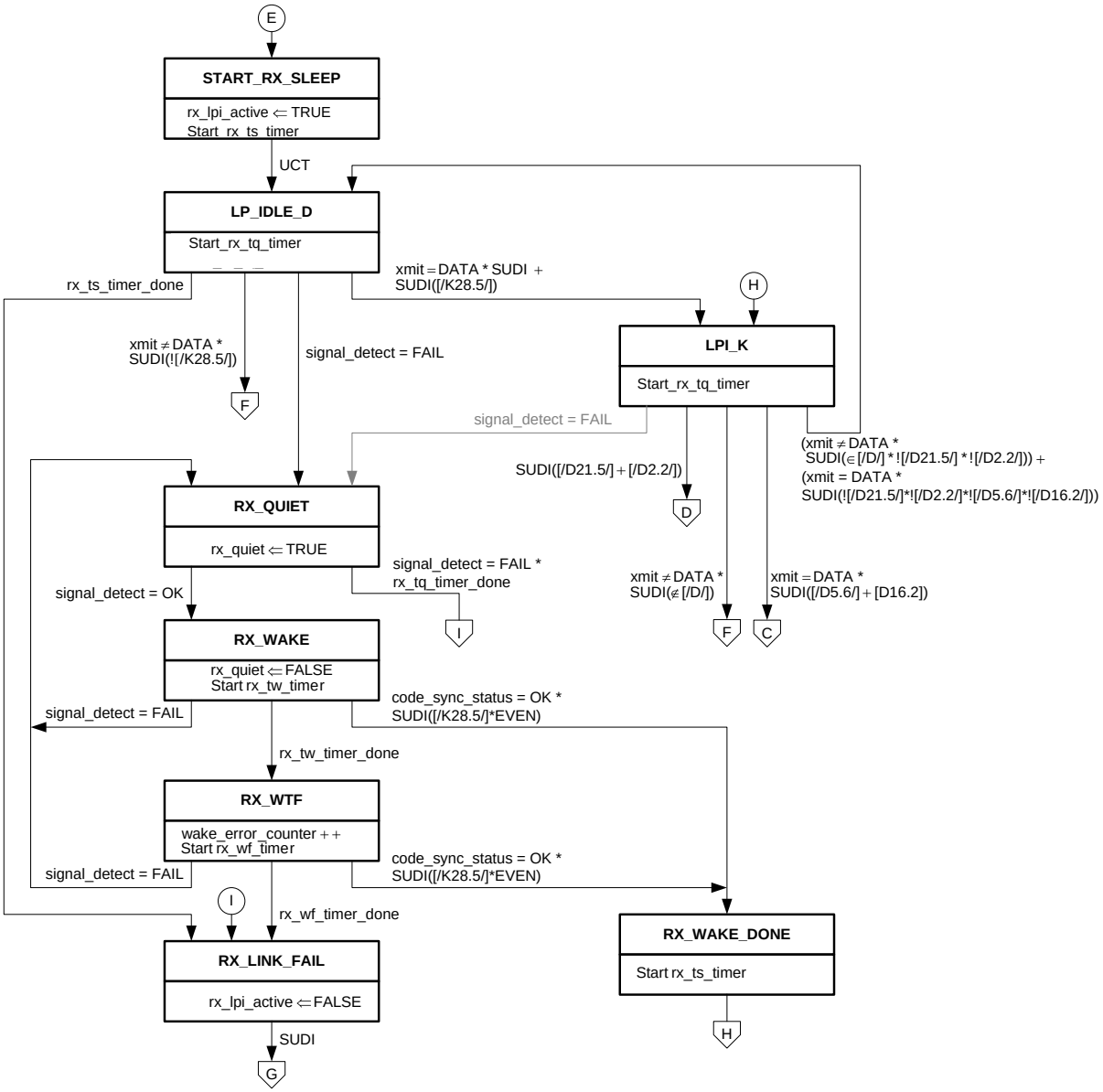


NOTE 1 — Outgoing arcs leading to labeled polygons flow offpage to corresponding incoming arcs leading from labeled circles on Figure 36–7b and Figure 36–7c, and vice versa.

NOTE 2 — State transitions encapsulated in dashed boxes are only required for the optional EEE capability.

Figure 36–7a – PCS Receive state diagram, part a

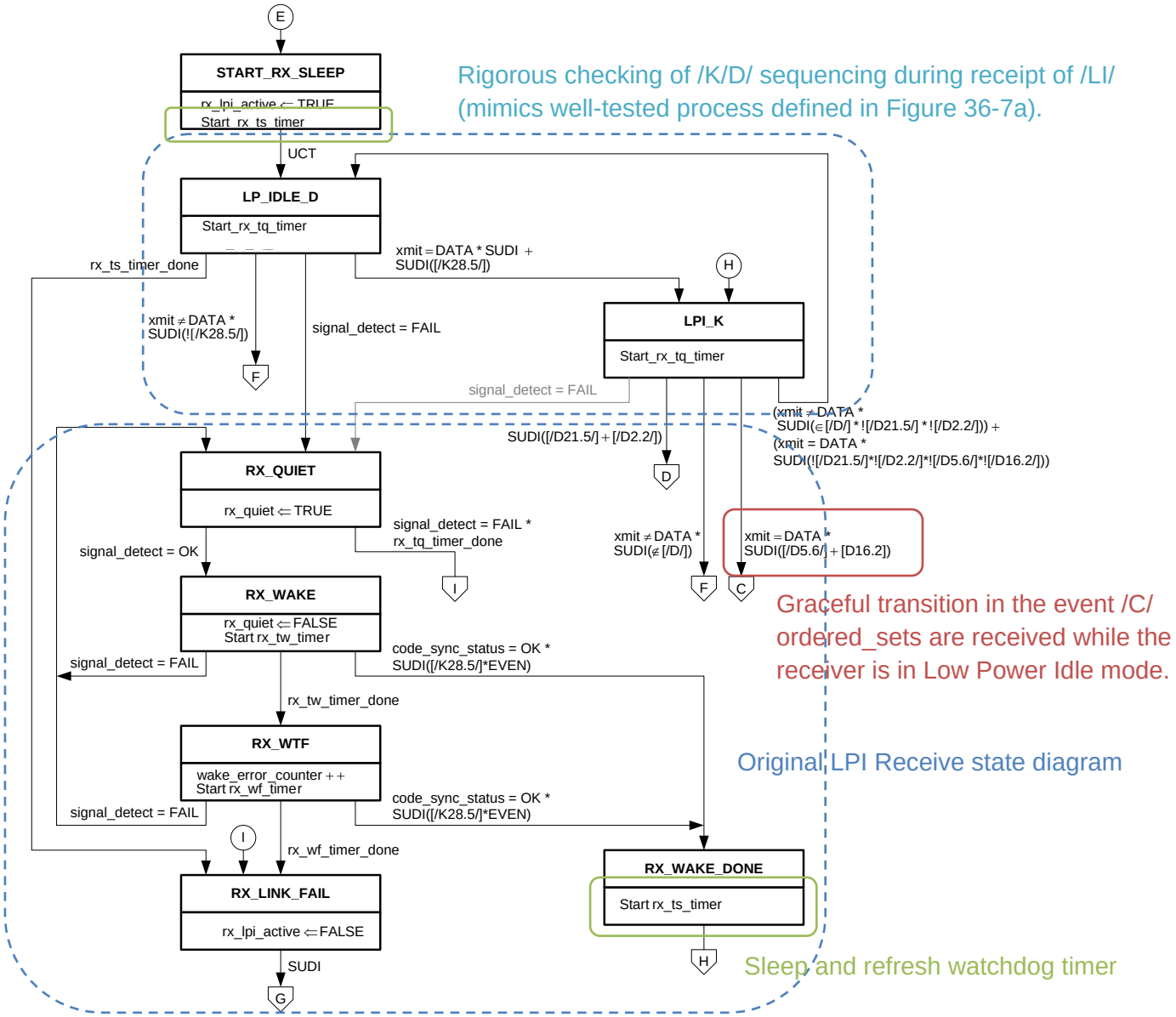
Insert Figure 36–7c:



NOTE 1 — Outgoing arcs leading to labeled polygons flow offpage to corresponding incoming arcs leading from labeled circles on Figure 36–7a, and vice versa.

Figure 36–7c – PCS Receive state diagram, part c (only required for the optional EEE capability)

Figure 36–7c (annotated):



NOTE 1 — Outgoing arcs leading to labeled polygons flow offpage to corresponding incoming arcs leading from labeled circles on Figure 36–7a, and vice versa.

Figure 36–7c – PCS Receive state diagram, part c (only required for the optional EEE capability)