PMD Link Training issues

Jeff Slavick

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Issue #1

- ENCODE_STS
  - Encodes portions of the status field of transmitted training frames. local_tf_lock is mapped to the receiver frame lock bit, k is mapped to the coefficient select echo bits, coef_sts is mapped to the coefficient status bits, ic_sts is mapped to the initial condition status bit, local_rx_ready is mapped to the receiver ready bit, and tp_mode is mapped to modulation and precoding bits (see 136.8.11.3.2).

tp_mode

Enumerated variable that corresponds to the "modulation and precoding status" bits in the status field of received training frames. It may be assigned one of the following values: pam2, pam4, pam4 with precoding.

- Tp_mode is based on the status field we receive, which is status of the remote Transmitter. The Status field we send must be based on the state of the local transmitter. ENCODE_STS updates the Status field we send.

Issue #2

- ENCODE_STS
  - Encodes portions of the status field of transmitted training frames. local_tf_lock is mapped to the receiver frame lock bit, k is mapped to the coefficient select echo bits, coef_sts is mapped to the coefficient status bits, ic_sts is mapped to the initial condition status bit, local_rx_ready is mapped to the receiver ready bit, and tp_mode is mapped to modulation and precoding bits (see 136.8.11.3.2).

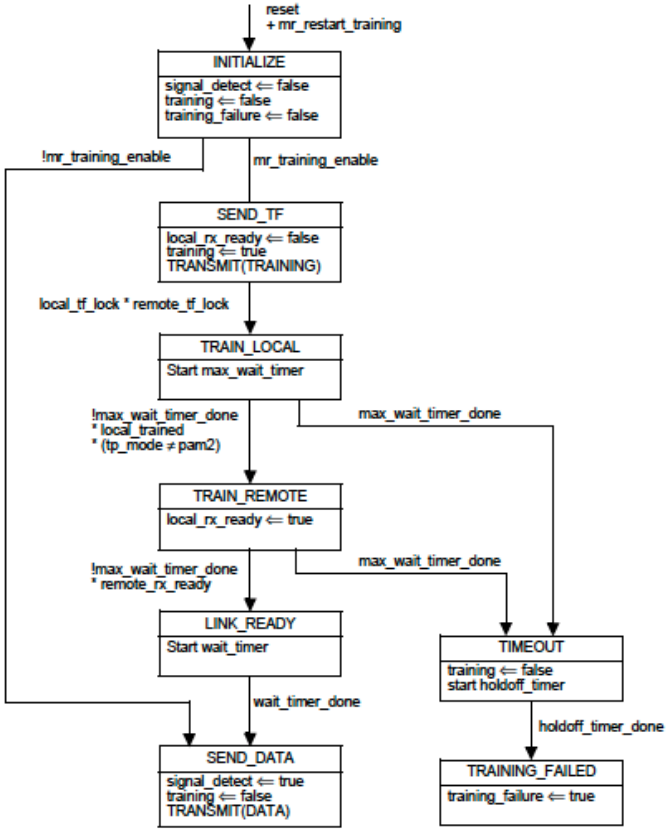

Figure 136–7—PMD control state diagram

- Local_rx_ready is updated in training FSM. But ENCODE_STS is not called by that FSM. So there's no locally initiated process to update the transmitted Status field when local_rx_ready asserts.

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Issue #3

- ENCODE_STS
  - Encodes portions of the status field of transmitted training frames. local_tf_lock is mapped to the receiver frame lock bit, k is mapped to the coefficient select echo bits, coef_sts is mapped to the coefficient status bits, ic_sts is mapped to the initial condition status bit, local_rx_ready is mapped to the receiver ready bit, and tp_mode is mapped to modulation and precoding bits (see 136.8.11.3.2).

local_tf_lock

Boolean variable that is true if the value of training is true and training frame marker positions have been identified and is false otherwise.

- Local_tf_lock is lowered when we enter a TRAINING FAILURE mechanism. But again the transmitted Status Field is not updated based on Figure 136-7 changing states.

Proposed Changes

- ENCODE_STS
  - Encodes portions of the status field of transmitted training frames. ~~local_tf_lock is mapped to the receiver frame lock bit~~, k is mapped to the coefficient select echo bits, coef_sts is mapped to the coefficient status bits, ic_sts is mapped to the initial condition status bit~~, local_rx_ready is mapped to the receiver ready bit, and tp_mode is mapped to modulation and precoding bits (see 136.8.11.3.2)~~.

- ENCODE_STS updates stuff that is changed by the COEFF UPDATE FSM

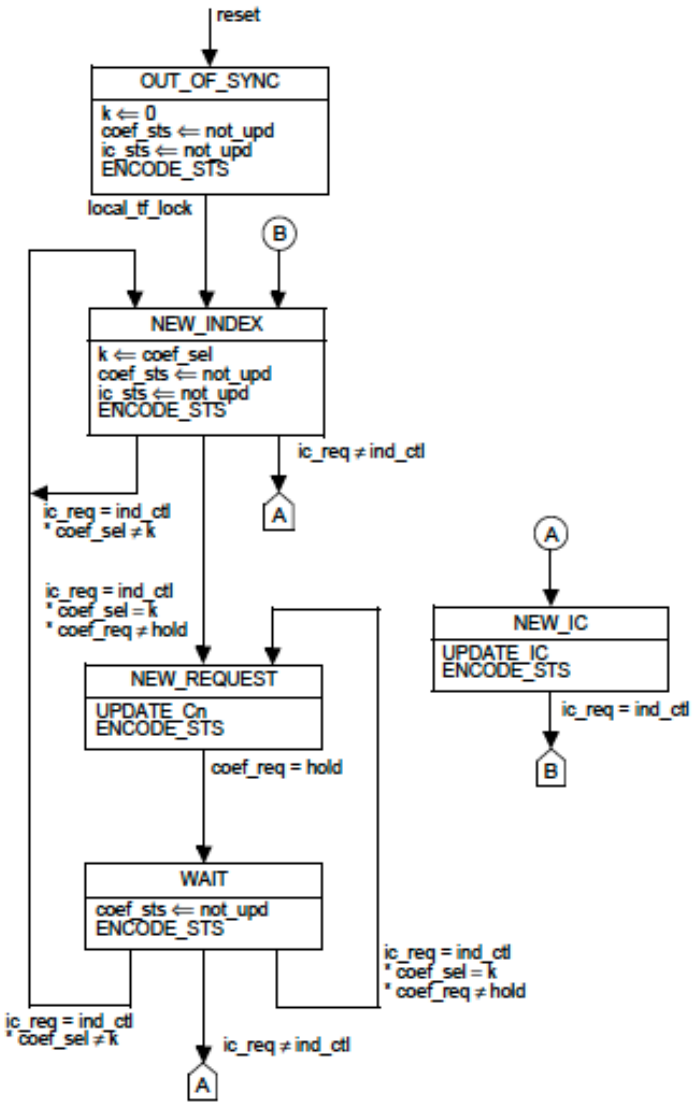

Figure 136–9—Coefficient update state diagram

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Proposed changes cont.

- Remote_rx_rdy and Modulation status are already covered sufficiently so no changes needed beyond the removal of their mapping from ENCODE_STS.

136.8.11.3.2 Modulation and precoding status

The modulation and precoding status bits acknowledge the modulation and precoding request bits received from the link partner. When a change in the received modulation and precoding request bits are detected, the format of the training pattern is changed accordingly (see 136.8.11.1.3). The modulation and precoding status bits are then updated to confirm that the change to the format of the training pattern was completed.

136.8.11.3.1 Receiver ready

The receiver ready bit is used to signal the local receiver state to the link partner. When this bit is 1, it indicates that the local receiver has completed training and is prepared to receive data. When this bit is 0, it indicates that the local receiver is requesting that training continue.

* May want to add “(local_rx_ready)” to 136.8.11.3.1 first sentence to improve clarity of mapping.

Proposed changes cont.

- Change 2nd sentence in the definition of

136.8.11.3.3 Receiver frame lock

When the receiver frame lock bit is set to 1, the receiver is indicating that it has identified training frame marker positions and is in a state where the response time requirements specified in 136.8.11.6 are met.

Receiver frame lock shall be set to 0 upon entering TRAINING mode and shall not be set to 1 until local_tf_lock is true.

- To: Receiver frame lock shall be set to 0 when the variable training is false and it shall not be set to 1 until training and local_tf_lock are both true.

- Training is set false when timeout occurs and when mr_restart_training occurs.

Proposed changes cont.

- Change definition of

local_tf_lock

Boolean variable that is true if the value of training is true and training frame marker positions have been identified and is false otherwise.

- To: Boolean variable that is if the training frame marker positions have identified and false otherwise.

- This allows for frame lock to be maintained locally when one side has timed out, but other is still going. Which aligns with how Clause 72 acts.

Proposed changes cont.

- Add “+ mr_restart_training” to both Figure 136-8 and 136-9
  - This aligns with how CI72 acts and forces all FSMs to reset when mr_resart_training asserts appropriately since a reset may not occur.

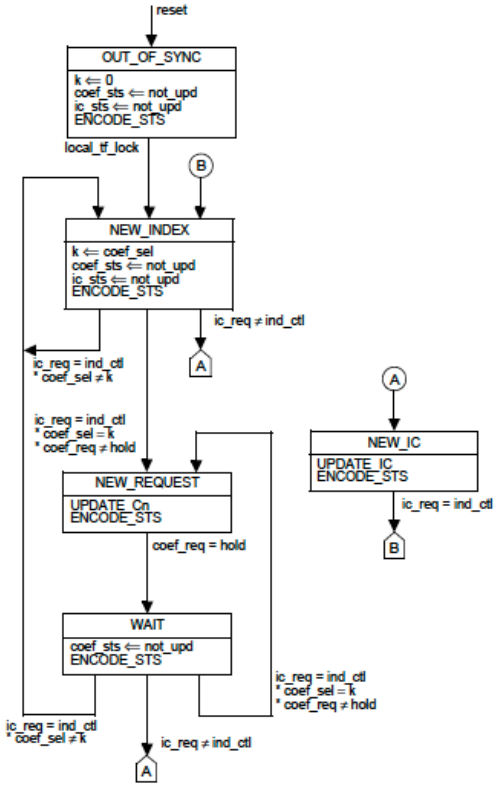

Figure 136–9—Coefficient update state diagram

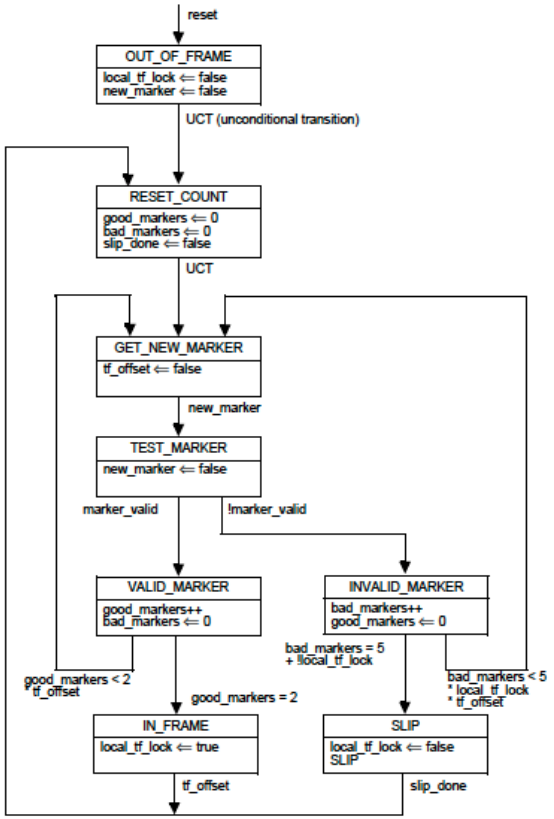

Figure 136–8—Training frame lock state diagram

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Discussion

- Discuss