CL 136 Link Training – Update Request Behavior

IEEE P802.3cd Task Force Logic Ad-Hoc

June 28 , 2017

Zvi Rechtman, Mellanox Technologies

Oded Wertheim, Mellanox Technologies

Problem Description

- Clause 136 link training process differs from clause 72, for example:
  - Single coefficient update request vs multiple coefficients update request.
  - Multiple presets vs initialize and single preset initial conditions.
- The responder behavior is defined by the “Coefficient update state diagram”.
- The requestor behavior is not explicitly defined, which can lead to misinterpretations by implementers.
- The presentation provides a proposal for the requestor behavior definition.

Responder behavior

- Transition from NEW_INDEX/WAIT to NEW_REQUEST
  - Upon individual request reception.
  - Additional “round” of NEW_INDEX will take place before the transition, in case the local coefficient index (k) is not set to the requested ***coef_sel*** value.
- Transition from NEW_REQUEST to WAIT
  - Upon reception of “hold” coefficient request.
- No transition between NEW_REQUEST and NEW_IC states.
- There is an assumption that the requestor follows a sequence of operations that matches the responder state machine transitions.

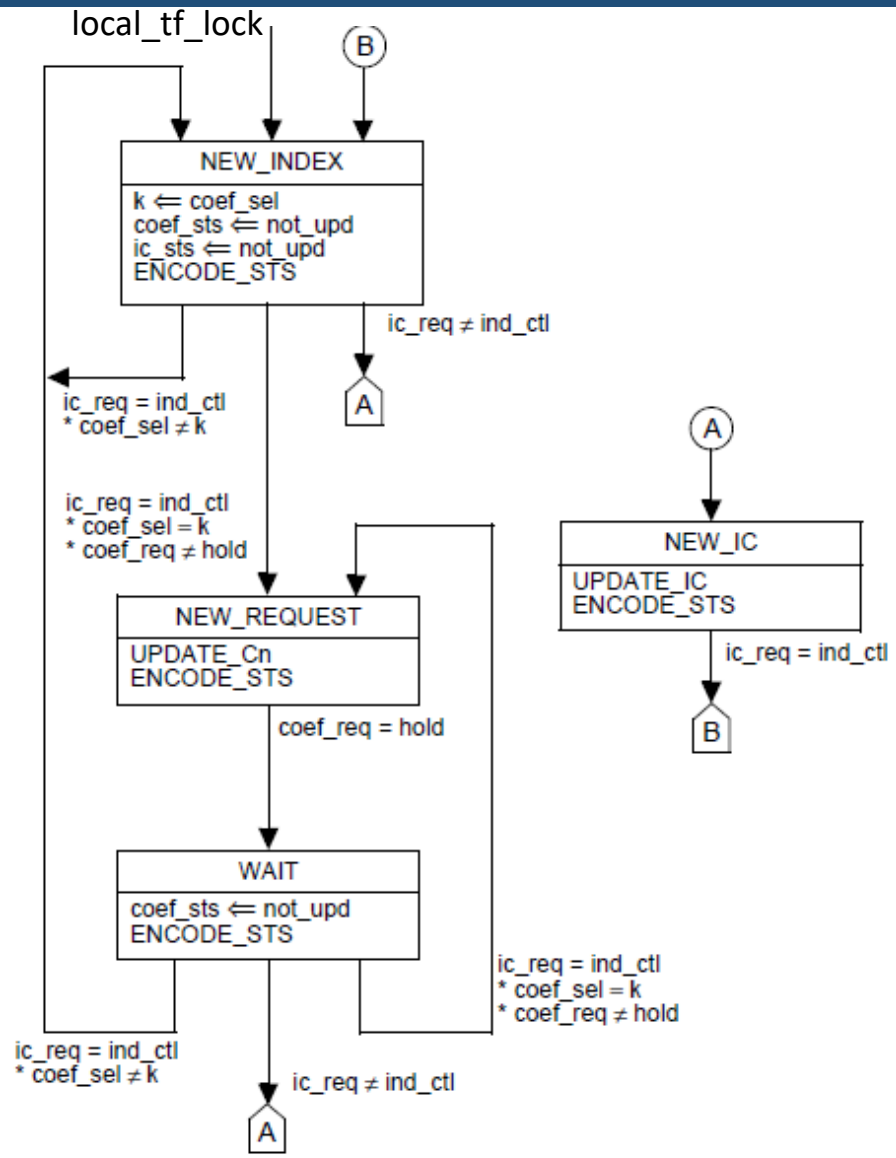
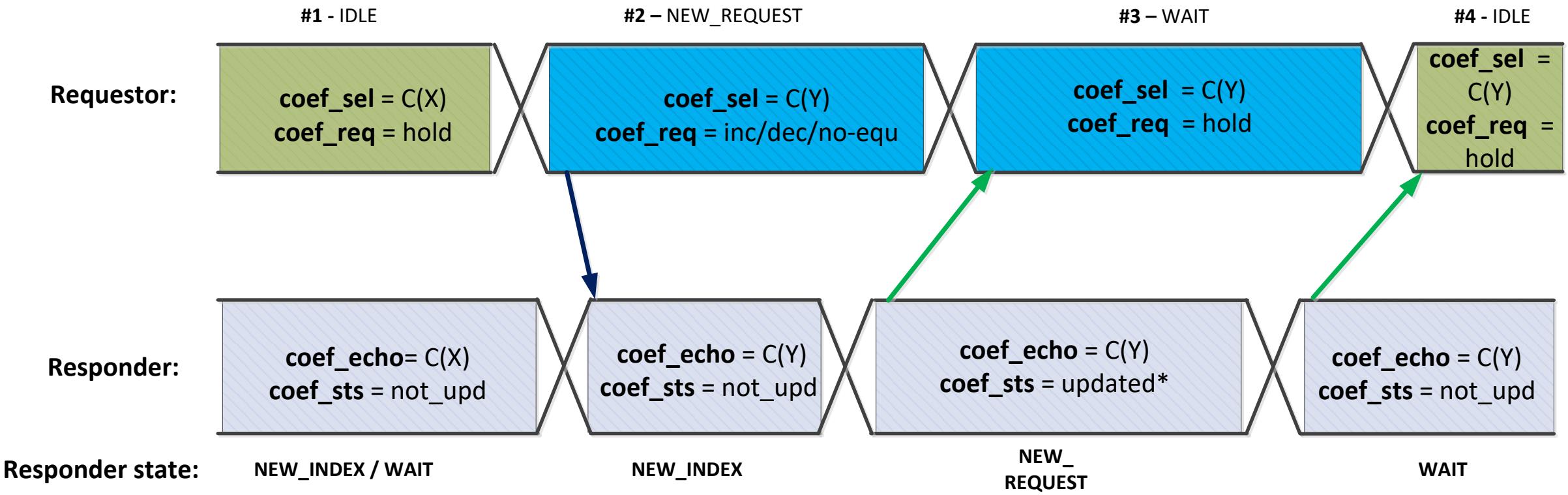


Figure 136–9—Coefficient update state diagram

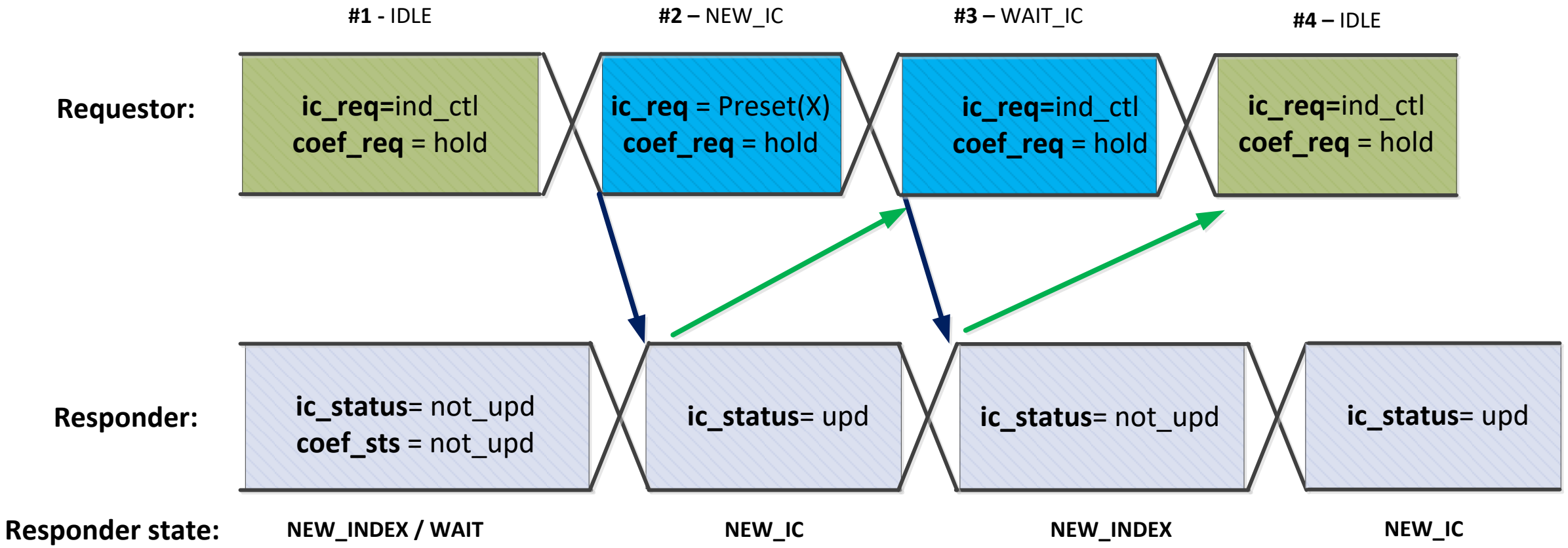
Requestor behavior for coefficient request



- can initiate a new request

- maintain the ***coef_sel*** and ***coef_req*** values

Requestor behavior for IC request



- can initiate a new request

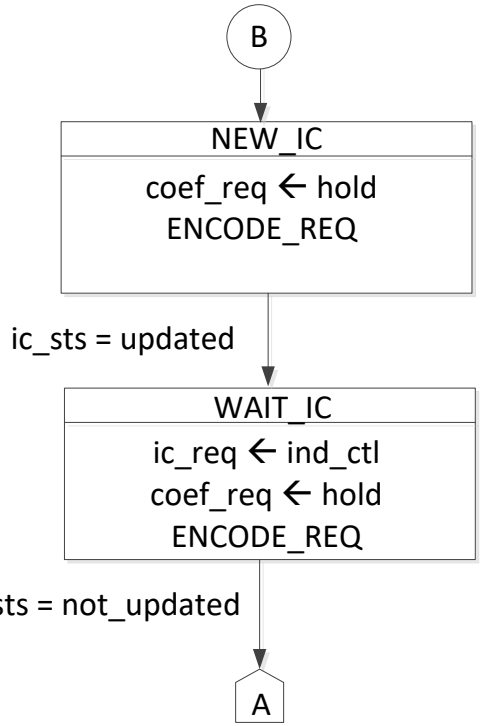
- maintain the ***ic_req*** and ***coef_req*** values

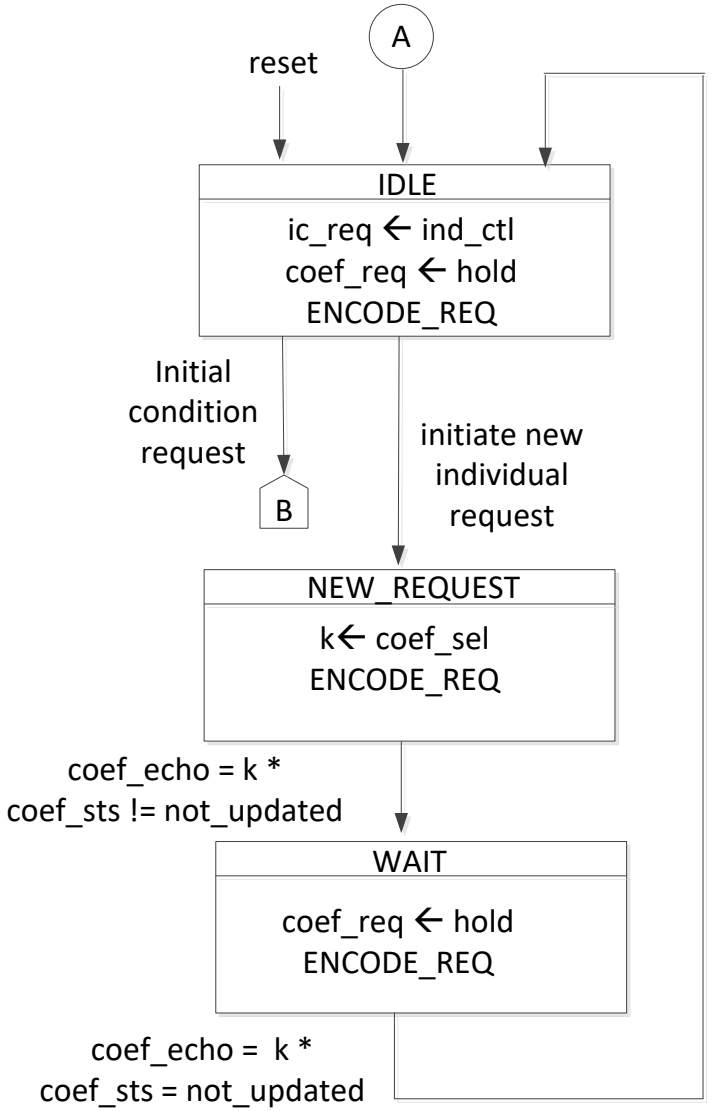
Option #1: Add description for the requestor behavior

- A request to change a coefficient is made by using the following procedure:
  - Wait until the received coefficient status bits (136.8.11.3.7) indicate "not updated".
  - Set the coefficient select bits (136.8.11.2.3) and coefficient request bits (136.8.11.2.4) to the desired values.
  - Wait until the received coefficient status bits (136.8.11.3.7) do not indicate "not updated".
  - Set the coefficient request bits (136.8.11.2.4) to "hold".
- A request to change the initial condition is made by using the following procedure:
  - Wait until both the initial condition status bits (136.8.11.3.4) and the coefficient status bits (136.8.11.3.7) indicate "not_updated“.
  - Set the initial condition request bits (136.8.11.2.1) to the desired pre-defined transmitter equalizer configuration (preset).
  - Wait until the initial condition status bits (136.8.11.3.4) indicate "updated“.
  - Set the initial condition request bits (136.8.11.2.1) to individual coefficient control, and set the coefficient request bits (136.8.11.2.4) to "hold".
- A procedure must be completed before initiating a new individual coefficient update request or initial condition update request.

Option #2: Add a requestor state machine

- NEW_IC
  - Request one of the presets.
  - Set coef_req = hold.
  - Transition to “WAIT_IC” when receiving ic_sts=updated.
    - Indicating that the peer responder entered “NEW_IC”
- WAIT_IC
  - Set individual coefficient control request.
  - Set coef_req = hold.
  - Transition to “IDLE” when receiving ic_sts=not_updated.
    - Indicating that the peer responder entered “NEW_INDEX”.
- IDLE
  - A new update sequence (preset or coefficient) can only start in the IDLE state.
- NEW_REQUEST
  - Set individual request value.
  - Transition to “WAIT” when receiving ic_sts!=not_updated.
    - Indicating that the peer responder entered “NEW_REQUEST”.
- WAIT
  - Set coef_req = hold.
  - Transition to “IDLE” when receiving ic_sts=not_updated.
    - Indicating that the peer responder entered “NEW_INDEX/WAIT”.





Thank You