Link Training Timer Update for D2.1
(comments # 66, 418)

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Introduction

- Discussion on the purpose of a timer during "link training" and the associated timer value has been ongoing. See:
  - https://www.ieee802.org/3/dj/public/25_01/slavick_3dj_01_2501.pdf
  - https://www.ieee802.org/3/dj/public/25_03/ran_3dj_02a_2503.pdf
  - https://www.ieee802.org/3/dj/public/25_05/lusted_3dj_01_2505.pdf
  - https://www.ieee802.org/3/dj/public/25_07/slavick_3dj_02_2507.pdf
- A timer is useful in some cases
- A timer is not desirable in other cases (e.g. debug)

Key Points

- The "link training" timer needs a reasonable default value to support various implementation choices

- There must be an option in the standard (e.g. normative) to disable the "link training" timer

FSM Update

- Additions to the original diagram are highlighted in green.

- The new timer is started in new state TRAIN_START.

- The timer is active during TRAIN_LOCAL and TRAIN_REMOTE, and stopped in ISL_READY.

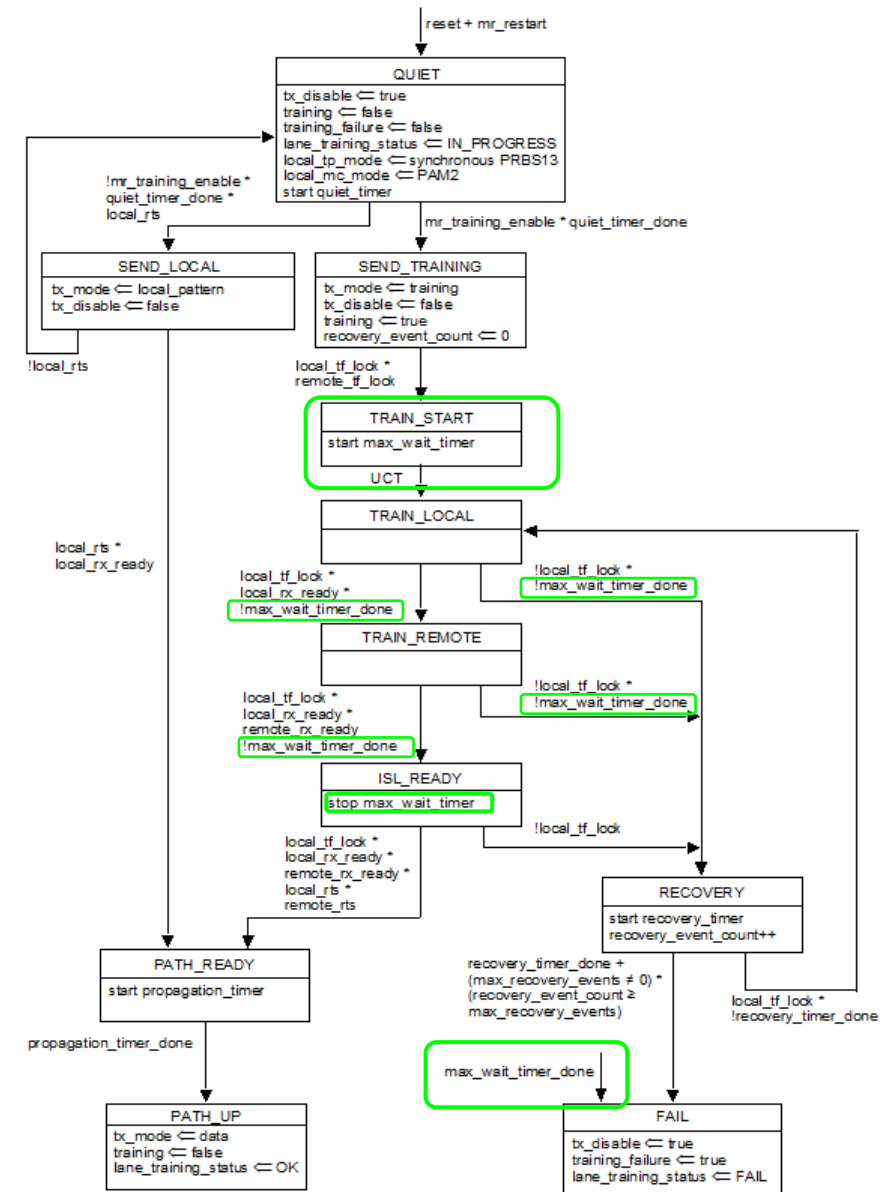- Expiry before it is stopped causes transition to FAIL.

Figure 178B–10—Training control state diagram

New Variables, Timers, and MDIO

- 178B.7.3.3 max_wait_timer
  - This timer is started when the training control state machine enters the TRAIN_START state (see Fig 178B-10). The terminal count of this timer is max_wait_timer_duration variable in seconds +/- 0.1% (see Table 178B-6). The default duration is specified by the AUI component or PMD. When the max_wait_timer_duration is set to 0, the timer duration is infinite and max_wait_time_done always remains false.
- 178B.7.3.1 max_wait_timer_duration
  - Integer variable value that sets the duration of the max_wait_timer in seconds (See 178B.14.3.3). The default value is specified by the AUI component or PMD.
- 45.x.x.x.x ILT max_wait_timer_duration
  - 16b MDIO register (R/W) that sets the maximum duration for adapting the equalization of the link when transmitting the training pattern during ILT specified in Annex 178B.
  - Add to Table 178B-6 (the mapping table).

Default values of max_wait_timer_duration

- 200GBASE-KR, 400GBASE-KR2, 800GBASE-KR4, 1.6TBASE-KR8, 200GBASE-CR, 400GBASE-CR2, 800GBASE-CR4, 1.6TBASE-CR8
  - The default value of max_wait_timer_duration is 12 seconds

- 200GAUI-1, 400GAUI-2, 800GAUI-4, 1.6TAUI-8
  - The default value of max_wait_timer_duration is 12 seconds

- 200GBASE-DR1, 400GBASE-DR2, 800GBASE-DR4, 1.6TBASE-DR8, 200GBASE-DR1-2, 400GBASE-DR2-2, 800GBASE-DR4-2, 1.6TBASE-DR8-2, 800GBASE-FR4-500, 800GBASE-FR4, 800GBASE-LR4
  - The default value of max_wait_timer_duration is 12 seconds

Proposal

- Adopt the proposed changes per slides 4-6

Thanks!