Updated Proposal For Coefficient Initial Conditions

(Comments 457 Simms, 514 Dawe, 425-426 Dudek)

Bill Simms, Piers Dawe, NVIDIA

Mike Dudek, Marvell

Supporters

- Names to be added

References

- Proposed update of Coefficient initial conditions (Table 179-8 and Table 176D-8)
  - Presented 802.3dj Joint Optics with Electrical and Logic ad hoc
  - 9th of Jan 2025
  - https://www.ieee802.org/3/dj/public/adhoc/optics/0125_OPTX/simms_3dj_optx_01a_250109.pdf

Review of Current Coefficient Initial Conditions

Table 179-8 and 176D-8 are similar

Table 179–8—Coefficient initial conditions

Coefficient update state	ic_req	*c*(−3)	*c*(−2)	*c*(−1)	*c*(0)	*c*(1)
OUT_OF_SYNC[a]	N/A	0	0	0	1	0
NEW_IC	preset 1[a]	0	0	0	1	0
	preset 2	0 ± 0.025	0 ± 0.025	0 ± 0.025	0.5 ± 0.025	0 ± 0.025
	preset 3	0 ± 0.025	0 ± 0.025	–0.075 ± 0.025	0.75 ± 0.025	0 ± 0.025
	preset 4	0 ± 0.025	0.05 ± 0.025	–0.2 ± 0.025	0.75 ± 0.025	0 ± 0.025
	preset 5	–0.025 ± 0.025	0.075 ± 0.025	–0.25 ± 0.025	0.65 ± 0.025	0 ± 0.025

[a] Preset 1 is the reference for the calculation of the normalized coefficients of the transmit equalizer (see 179.9.4.1.1). As a result, the normalized coefficients for preset 1 and OUT_OF_SYNC do not include any tolerances.

Paraphrased comments on table(s) in draft 1.3 (ref 1)

- Comment D1.3 457 Simms
  - Note that preset 1 to preset 2 is a coarse adjustment
- Comment D1.3 514 Dawe
  - Preset 1 is used for default measurement setup (comment D1.3 514 Dawe)
  - Preset 1 is the highest setting
  - Preset 1 is highest xtalk
  - 200G/lane C2M AUI when connected to 50G/lane and 100G/lane C2M AUI may exceed the 900mV limit of these AUIs.
  - C2C, C2M, CR, and KR can be aligned for convenience
  - Values of Preset 1 are also used for OUT_OF_SYNC
- Comment D1.3 425 Dudek
  - C2M receivers may be overloaded on short links at start of transmitter training
  - Propose lower C(0) to 0.5 for OUT_OF_SYNC
- Comment D1.3 426 Dudek
  - 1V amplitude peak-to-peak signal possible from compliant transmitter
  - May overload RX making it incapable of reducing amplitude through training protocol
  - Propose lower C(0) to 0.8 for OUT_OF_SYNC in table 179-8
  - Similar changes in Clause 179 and Annex 176C

Feedback during Jan 9th ad hoc and further comments

- Strong support
  - No Change to Preset 1 to be as light a touch to spec as possible
  - Training should continue to start with a 1-tap preset (no emphasis)
  - Setup for testing can remain as is, max swing no emphasis
- Changing OUT_OF_SYNC value with no other changes is insufficient
- Consolidate use of 0.75 rather than 0.5 for some and 0.8 for others as stated in comments
- Training starts in PAM2 where XTALK is $sqrt(\frac{9}{5})$ higher than that of PAM4 and could degrade adjacent lanes which might already be in mission mode
- Are all 3 presets with emphasis needed?
  - Can we change preset 3 to (0 0 0 0.75 0)?
- DME in training are lower frequency than data
  - Loss is lower at lower frequency
  - Peak-to-peak amplitude at receiver with no emphasis will not be significantly lower on higher loss channels and may overload the receiver

Updated Proposal

- No change to definition or values of Preset 1
- Create new preset 6 with C(0) set to 0.75 and no other EQ
- Change OUT_OF_SYNC to be equal to Preset 6 values
- Change 178B.11.2 to call out setting to Preset 6 on entry to the QUIET State
- Amend 178B.7 and 178B11.2 (including 178B-2) to add Preset 6

Proposed edit to tables 179-8 and 176D-8

Coefficient update state	ic_req	c(-3)	c(-2)	c(-1)	c(0)	c(1)
OUT_OF_SYNC	N/A	0 ±0.025	0 ±0.025	0 ±0.025	0.75 ±0.025	0 ±0.025
NEW_IC	preset 1	0	0	0	1	0
	preset 2	0 ±0.025	0 ±0.025	0 ±0.025	0.5 ±0.025	0 ±0.025
	preset 3	0 ±0.025	0 ±0.025	-0.075 ±0.025	0.75 ±0.025	0 ±0.025
	preset 4	0 ±0.025	0.05 ±0.025	-0.2 ±0.025	0.75 ±0.025	0 ±0.025
	preset 5	-0.025 ±0.025	0.075 ±0.025	-0.25 ±0.025	0.65 ±0.025	0 ±0.025
	preset 6	0 ±0.025	0 ±0.025	0 ±0.025	0.75 ±0.025	0 ±0.025

Thanks