RS Frame Delineation

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What is “RS Frame Delineation”?

1. 802.3-2005 clause **46.1.7.5.3**:

   DATA_VALID_STATUS shall assume the value DATA_VALID when a PLS_DATA.indication transaction is generated in response to reception of a Start control character on lane 0 if the prior RXC<3:0> and RXD<31:0> contained four Idle characters or a Sequence ordered set.

2. What is the rationale for requiring the RS to treat /S/ as a real start-of-frame only if four IDLEs precede?

   - Increasing the number of bit errors that would have to happen to create a spurious start-of-packet in mid-data (cf. http://www.ieee802.org/3/10G_study/email/msg04413.html)

In 10GEPON

1. Does the 10GEPON RS implement the requirement for preceding IDLEs before START as Clause 46 indicates

   - Yes, and there has been no suggestion to change it

2. Does 10GEPON need this burst error protection?

   - FEC error detection is much more reliable protection
   - OLT receiving RS will receive /E/ between bursts
   - Marginal protection against undetected FEC errors

3. What about the “IDLE insertion” function?

   - IDLE insertion inserts IDLEs between frames (and among interburst /E/ codes) on OLT Upstream

   - So: the /I/-before-/S/ protection is already broken, and it’s not really much of a concern

So how can we omit the RS Delineation IDLEs at the beginning of the upstream burst?

One approach is suggested in 3av_0801_effenberger_2:

- Receiver should replace the 66b block used for scrambler sync with a block of 4 IDLEs that are then used by RS for the delineation requirement

- But this seems to require sending a start-of-burst indication from the FEC decoder to some new entity located above the scrambler which does the replacement

So how can we omit the RS Delineation IDLES at the beginning of the upstream burst?

Slightly different approach: IDLE insertion function in OLT PCS *translates* /E/ to /I/ for a

- IDLE insertion function already tracks in-frame/between-frame
- *block_lock* flag switching to 1 triggers IDLE insertion function to "Replace /E/ with /I/"
- Detection of first frame trigger IDLE insertion function to "Restore normal operation"
- Note: the receiving RS treats Interframe /E/ and /I/ in *precisely the same manner* (other than the /I/-before-/S/ rule)