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Proposals to Adopt for the PCS for 100BASE-T1L

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Proposal for PCS for 100BASE-T1L PHY: PCS Tx Scrambler

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- See Clause 40.3.1.3.2
- Generator polynomials for Master and Slave for data are:
  - Master: $g_M(x) = 1 + x^{13} + x^{33}$
  - Slave: $g_S(x) = 1 + x^{20} + x^{33}$
- Scrambling is done per 8b/6T octet
  - The bits stored in the scrambler shift register delay line at time n are denoted by $Scr_n[32:0]$
  - At each octet period, the shift register is advanced by one bit, and a new bit represented by $Scr_n[0]$ is generated
  - Encoding rules are based on the generation, at time n, of nine bits: $Sx_n[3:0]$, $Sy_n[3:0]$ and Sg_n
    - The eight $Sx_n[3:0]$ and $Sy_n[3:0]$ bits are used to decorrelate the octet $TD_n[7:0]$ during transmission
    - Sg_n is used to randomize the sign of the NND 6T symbol in the 8b6T encoder

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- $Sx_n[3:0]$, $Sy_n[3:0]$ and Sg_n are generated using three uncorrelated bits, X_n, Y_n and $Scr_n[0]$, and an auxiliary generator polynomial, g(x), as in Clause 40:
  - The bits X_n and Y_n derived from elements of the same maximum-length shift register sequence of length 2^{33}–1 as $Scr_n[0]$, but shifted in time
  - **The associated delays are all large and different so that there is no short-term correlation among the bits X_n, Y_n and $Scr_n[0]$**
  - They are generated as follows:

$$X_n = Scr_n[4] \wedge Scr_n[6]$$
$$Y_n = Scr_n[1] \wedge Scr_n[5]$$

  - The generator polynomial is:

$$g(x) = x^3 \wedge x^8$$

  - $Sx_n[3:0]$, $Sy_n[3:0]$ and Sg_n are generated as follows:

$$Sy_n[0] = Scr_n[0]$$
$$Sy_n[1] = g(Scr_n[0]) = Scr_n[3] \wedge Scr_n[8]$$
$$Sy_n[2] = g^2(Scr_n[0]) = Scr_n[6] \wedge Scr_n[16]$$
$$Sy_n[3] = g^3(Scr_n[0]) = Scr_n[9] \wedge Scr_n[14] \wedge Scr_n[19] \wedge Scr_n[24]$$
$$Sg_n = Y_n = Scr_n[1] \wedge Scr_n[5]$$

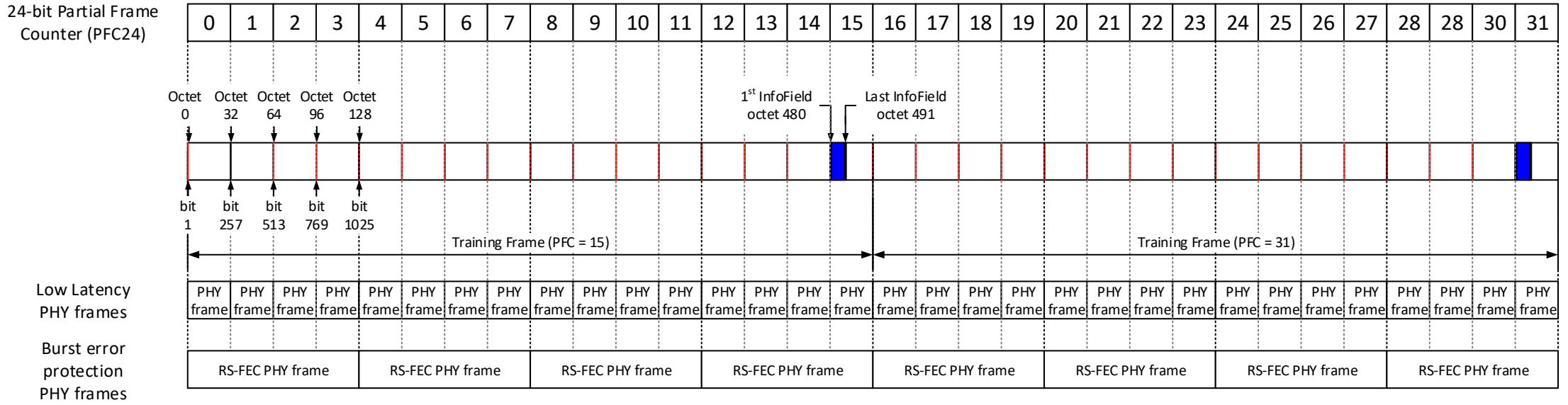
$$Sx_n[0] = X_n = Scr_n[4] \wedge Scr_n[6]$$
$$Sx_n[1] = g(X_n) = Scr_n[7] \wedge Scr_n[9] \wedge Scr_n[12] \wedge Scr_n[14]$$
$$Sx_n[2] = g^2(X_n) = Scr_n[10] \wedge Scr_n[12] \wedge Scr_n[20] \wedge Scr_n[22]$$
$$Sx_n[3] = g^3(X_n) = Scr_n[13] \wedge Scr_n[15] \wedge Scr_n[18] \wedge Scr_n[20] \wedge Scr_n[23] \wedge Scr_n[25] \wedge Scr_n[28] \wedge Scr_n[30]$$

- The scrambled data octet, $Sd_n[7:0]$ is generated as follows:

$$Sd_n[7:4] = Sx_n[7:4] \wedge TD_n[7:4]$$
$$Sd_n[3:0] = Sy_n[3:0] \wedge TD_n[3:0]$$

Proposal for PCS for 100BASE-T1L PHY: PMA Training Frame

- Training frames with indicators are sent during PMA training to establish the alignment of the PHY frames



- Each training frame is composed of 16 partial PHY frame
- Bit 1 position, period and partial frame length and the exact contents of the Info Field to be decided
  - Note diagram above is an example