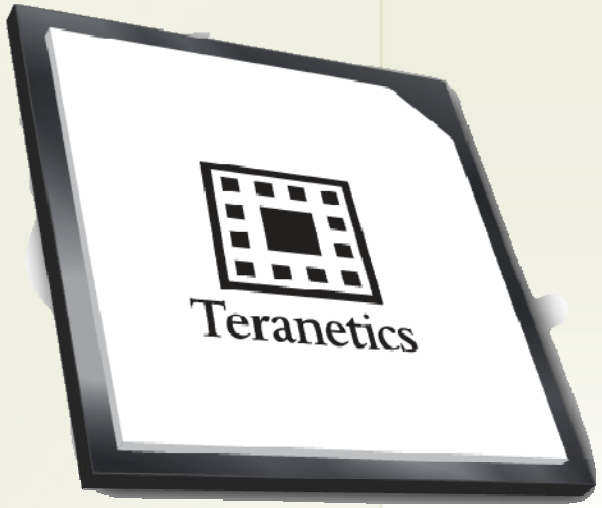

Alert signal for 10GBASE-T

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Alert Signal – memory refresh…

- Definition: Signal transmitted to inform the link partner that the local transmitter is returning to the active state.
- Requirements:
  - Needs to be easily detectable signal with low false-alarm and more importantly low miss-detection probability
  - Short enough to ensure fast recovery time ($4T_F$ was proposed)
- Note:
  - Since only single bit of information to be communicated, significant processing gain is possible over several LPDC frames

“Quick & Dirty” Correlator

- Use MFB (matched filter bound) on known PAM2 pattern
- At 100m,
  - Norm(‘signal’=IL)= -15dB relative to tx level
- For worst case impairments,
  - Norm (‘noise’ = RL+NEXT+FEXT, etc) = -10dB
- Processing gain: 24dB if one LDPC frame is used, 3 more dB’s for each doubling of frames (up to 30dB with 4 frames)
- From above, for single LDPC frame SNR_{MFB} (Alert=ON/OFF) ~ 20dB
- One LDPC frame (320ns) would give better than 1e-20 of miss detection without any Echo Can, NEXT, FEXT or EQ
  - Even in the asymmetrical case with LPI only in one direction.
  - Margin could be improved by partial Echo Cancellation

Alert Summary

- Transmit PAM2 constellation with bypass THP.
  - Receiver correlator only requires adders
- Use 63-chip Gold sequence
  - Has good Auto-correlation – comparable to this demonstrated by DSSS
  - Allows simple peak-detection implementation for lane monitoring with following full sequence verification
  - Use different sequence for Master and Slave
    - Ideally with very low cross-correlation to avoid false alarms
- LFSR by-passed when Alert signal is generated
- Nominal PBO (agreed during last start-up)