Next steps for EEE Draft

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Clause list

	Comment/ Qualifier	Clause	Subclauses	Editor
Energy Efficient Ethernet	New	93		Dimitry Taich
Twisted pair				
10BASE-T		14		Mandeep Chadha
100BASE-TX	Full Duplex	24, 25		Joseph Chou
1000BASE-T	Full Duplex	40		Adam Healey
10GBASE-T		55		Gavin Parnaby
Backplane		69		David Koenen
1000BASE-KX		70		David Koenen
10GBASE-KX4		71		David Koenen
10GBASE-KR		72		David Koenen

Clause list 2

	Comment/ Qualifier	Clause	Subclauses	Editor
MAC interfaces				
MIII		22		Hugh Barrass
GMII		35		Hugh Barrass
XGMII		46		Hugh Barrass
Autoneg Twisted pair		28		Jeff Lapak/Hugh Barrass
Autoneg Backplane		73		Jeff Lapak/Hugh Barrass
GDMO		30		Hugh Barrass
Management		45		Hugh Barrass
Introduction		1		
Introduction to 100		21		
Introduction to 1000		34		
Introduction to 10G		44		

Status

- D0.1 was published prior to July Plenary
- D0.1 is missing a baseline for backplane EEE
  - Hope to resolve this at this meeting
- D0.9 will be published prior to September Interim
  - Likely August 25th
  - Comments should be submitted prior to Sept 1st
  - Proposed responses will be posted a week prior to the meeting
- Comment should be submitted via comment tool
- Goal is to take D0.9 together with comment resolutions from Sept interim and generate D1.0

Nomenclature

- 10BASE-T EEE will be referred to as 10BASE-Te
- For rest of T family and backplane:
  - No new name because EEE is an option
  - xMII sends TX_LP_IDLE (this is the name of the signal)
  - In response the PHY, depending on PHY type, will either:
    - Put its Transmitter into a low power transmit state
    - Or send LPI signals to link partner and wait for LPI signals back
      - Then put its transmitter into a low power transmit state
- Same philosophy will be applied in the receive direction

Clause 14 modifications

- Completed
  - Updated text in clause 14 to include 10BASE-Te mode of operation
  - Added new TPM for 10BASE-Te
  - Updated PICS proforma tables to include requirements for 10BASE-Te
- TBD
  - Validate proposed TPM with other waveform tests (TP_IDL, link pulse) and all loads

Clause 40: Big Ticket Items

- EEE is expected to be an optional mode for a 1000BASE-T PHY. When supported, it is a feature that may be enabled/disabled by management (per Auto-Negotiation or user intervention)
  - More clearly delineate optional EEE features from baseline 1000BASE-T requirements
  - Introduce enable/disable variable (e.g. mr_eee_enable) to qualify entry into low-power idle encoding state and low power mode
- Finalize timer values with tolerances (e.g. compliant range)
  - Several TBD's
- Define management register to state diagram variable timing
  - e.g. enable/disable, arbitrated PHY wake time
- Define signal_detect function
  - Logically associated with the PMA receive function
- Update PICS proforma when draft content has stabilized

Open items for 10GBASE-T EEE

Gavin Parnaby, Solarflare

Dimitri Taich, Teranetics

7/15/2008

Overview

- 1. Sleep signaling
- 2. Quiet / refresh
- 3. Alert
- 4. Wake
- 5. Test modes
- 6. Parameter Values
- 7. State machines
- 8. Test modes
- 9. Summary

Sleep signaling

- Sleep signals to the far end that the local PHY is going into LPI mode
- Sleep is composed of repeated XGMII LP_IDLE codewords encoded in LDPC frames and uses DSQ/PAM-16 signaling (taich_02_0508)
- Length of sleep signal, t_s, TBD
- Need precise definition on alignment for symmetric LPI
- Will affect 55.3 (PCS), 55.5 (PMA testing?)

Quiet/refresh (I)

Quiet/refresh signaling has a number of open items

- Quiet time t_q
- Refresh time t_r
  - [both are integer multiples of LDPC frame time t_f]
- Refresh signaling TBD; most likely either
  - PAM-2 [training pattern]
  - PAM-16/DSQ [data-mode]
  - Trade adaptation robustness vs change going back to data mode
- Staggered vs non-staggered
- Values proposed in taich_02_0508 are

  t_q=100 t_f ; t_r=4 t_f

Quiet/refresh (II)

- There is no specification on frequency stability
- Slave's ability to track master's timing over quiet period depends upon frequency drift [grimwood_01_0308]
- Need to address frequency drift requirements in order to propose Tq/Tr pairs which meet stated power savings with adequate link stability
- Will affect 55.3 (PCS), 55.4 (PMA), 55.5 (PMA testing?)

Alert

- This signal is used to communicate to the link partner that local system is exiting Low Power Idle state
- Requirements: easily detected with low power circuits
- Signaling may be different depending upon whether the link is in a quiet or a refresh period
- No details in any presentation so far
- The alert signal needs to be a signal which is easily detectable with low false-alarm probability
- Since only single bit of information to be communicated, significant processing gain of several LPDC frames can be used to accomplish above requirement
- Will affect 55.3 (PCS), 55.5 (PMA testing?)

Wake

- Following alert, wake signal is DSQ/PAM-16 symbols
- Wake time Taw TBD
  - Do we need an explicit PHY wake signal?
- System wake time Tw [wertheimer_01_0308] is repeated IDLE codewords, encompasses Taw
- Affects PCS (55.3)

10G-specific parameters values determination and verification

- Fixed parameters - Ts, Ta, Taw.
- Negotiable parameters - Tr, Tq. How many sets are we going to specify ?
  - (2 sets – one for max power saving, one for max performance were proposed)
- Initial values been proposed in taich_02_0508 – were not discussed further neither verified by other vendors
- Will affect 55.3 - PCS

State Machines modifications

- Similar work to what has been done in healey_02_0508.pdf for 1000BASE-T mode
- Will affect 55.3 - PCS

Additional Test Modes

- Transmit jitter-slave in EEE mode
- BER verification upon EEE mode exit
- Special test mode for Alert Signal?
- Special test for frequency stability
  - Currently not specified in 10GBASE-T
  - Common issue with 1000BASE-T
- Will affect 55.5 – PMA Electrical

Summary

- Long list of open items to be addressed
- Related to PCS, PMA, and testing subclauses
- Need to make progress fast – so…….
- We suggest forming a task force and sharing the load among as many players as possible. Currently committed members:
  - Gavin Parnaby – Solarflare
  - Dimitry Taich – Teranetics