

AN PHY AND FEC SELECTION

Eric Baden (Broadcom) Rob Stone (Broadcom) Howard Frazier (Broadcom)

FEBRUARY 25, 2015

- Common goals derived from ad-hocs & offline discussions:
 - Meet 802.3by Objectives:
 - 3m, 5m (and < 3m with no FEC)
 - Preserve Flexibility
 - Allow optimized cost (implementation, test, silicon area, power)
 - Allow control of performance (i.e. prioritize for latency vs. link robustness, depending on end application)
 - Plug and Play Operation
 - Happy end user (minimize frustration and confusion)
- This presentation is an attempt to encompass this feedback from the group – and revises the previous AN proposals baden_021115_25GE_adhoc.pdf

THREE PHY TYPEs

- Create three PHY types (CR-L, CR-S and CR-N)
 - CR-L CL108: mandatory to implement and enable
 - CR-S CL74: mandatory to implement and enable
 - CR-N No FEC: mandatory to enable
- Pros:
 - Permits both user and implementer maximum flexibility by selectively advertising
 - CR-N is essentially "free" from implementation cost
 - Plug and Play / Interoperability is clear for end user
- Cons:
 - Three PHY types created in base page (maybe not a large drawback)

RESOLUTION

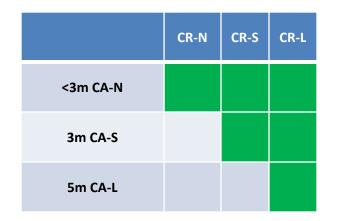
• BASE PAGE BITS

- CR-L, CR-S, CR-N
- PRIORITY
 - CRL, then CR-S, then CR-N
- EQUATIONS for LPA and LPB
 - If (LPA.CR-L & LPB.CR-L)
 - CR-L
 - Else if (LPA.CR-S & LPB.CR-S)
 - CR-S
 - Else if (LPA.CR-N & LPB.CR-N)
 - CR-N
 - Else
 - No link up.

RESOLUTION

LPA			LPB			RESULT
CR-L	CR-S	CR-N	CR-L	CR-S	CR-N	
0	0	0	0	0	0	N/A
Х	Х	1	0	0	1	CR-N
Х	0	1	0	1	1	CR-N
0	Х	1	1	0	1	CR-N
0	0	1	1	1	1	CR-N
Х	1	Х	0	1	Х	CR-S
0	1	Х	0	1	1	CR-S
0	1	Х	1	1	0	CR-S
0	1	Х	1	1	1	CR-S
1	Х	Х	1	0	0	CR-L
1	Х	Х	1	0	1	CR-L
1	Х	Х	1	1	1	CR-L

Three PHYs & Channel Support



- Can operate in FEC "overkill" mode if necessary over shorter cables to allow maximum interoperability
- Propose an additional base page bit to control link integrity vs low latency prioritization, for use case flexibility, via HCD re-map
 - HCD_Remap = 0 : HCD CR-L > CR-S > CR-N
 - HCD_Remap = 1 : HCD CR-N > CR-S > CR-L
 - Note: it is assumed that host would only permit advertisement of PHYs consistent with knowledge of channel type

RESOLUTION WITH HCD_REMAP

- BASE PAGE BITS
 - CR-L, CR-S, CR-N, HCD_REMAP
- REMAP = LPA.HCD_REMAP and LPB.HCD_REMAP

- If !(HCD_REMAP)
 - If (LPA.CR-L & LPB.CR-L)
 - CR-L
 - Else if (LPA.CR-S & LPB.CR-S)
 - CR-S
 - Else if (LPA.CR-N & LPB.CR-N)
 - CR-N
 - Else
 - No link up.

- If (HCD_REMAP)
 - If (LPA.CR-N & LPB.CR-N)
 - CR-N
 - Else if (LPA.CR-S & LPB.CR-S)
 - CR-S
 - Else if (LPA.CR-L & LPB.CR-L)
 - CR-L
 - Else
 - No link up.

Extending to KR

- Drop –KR designation, and have PHY types apply equally to –KR and –CR
- AN between KR and CR is meaningless because they do not share a common MDI
- PHY modes are identical (CR4 is constrained by KR4 per 802.3bj as outlined in Annex 92A)
- Minimizes addition of base page bits

Summary

- Auto-negotiation using 3 PHY types is proposed to address maximum flexibility and clarity to implementers and end users
- 4 bits total would be added to base page
 - Technology Ability Field (CR-L, CR-S, CR-N)
 - Integrity (or Latency) Prioritization Bit
 - Would apply equally to KR and CR media