

# AN PHY AND FEC SELECTION

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- 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  
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# 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
X	X	1	0	0	1	CR-N
X	0	1	0	1	1	CR-N
0	X	1	1	0	1	CR-N
0	0	1	1	1	1	CR-N
X	1	X	0	1	X	CR-S
0	1	X	0	1	1	CR-S
0	1	X	1	1	0	CR-S
0	1	X	1	1	1	CR-S
1	X	X	1	0	0	CR-L
1	X	X	1	0	1	CR-L
1	X	X	1	1	1	CR-L

# Three PHYs & Channel Support

	CR-N	CR-S	CR-L
<3m CA-N	Support	Support	Support
3m CA-S	Not Support	Support	Support
5m CA-L	Not Support	Not Support	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
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- 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