
Link Configuration Issues/Solution

**Bunch/Kadambi
January 1997**

Draft 1 Specification Issues

- ◆ **Inconsistent management interface across technologies**
- ◆ **Re-invents a previously established link configuration mechanism**
 - Auto-Negotiation algorithm is independent of wire encoding of Link Code Word (i.e. FLPs vs. C codes)
- ◆ **Splits basic communication mechanism from “Link Configuration”, Clause 37**
- ◆ **New timer conventions**

Draft 1 Specification Issues (cont.)

- ◆ **“Synchronization” is really “link status”**
 - Synchronization is responsible for ensuring underlying channel is capable of data transfer
 - Link Control is used by the Arbitration function to enable the PMA
 - Link Control is currently a floating input
- ◆ **“Signal Status” set/reset by ???**
 - Output from PMD, yet set by Loss of Synchronization
- ◆ **Protocol needs mechanism to restart link (reset)**
- ◆ **Next page support**
 - Included in configuration register definition
 - No support in transport mechanism
 - Clause 37 definition incomplete/incorrect
 - Either include it or not!

Current Path Forward?

- ◆ **Verify new/current architecture**
 - link_status, signal_status, sync_acquired, timers
 - State machine behavior
 - Link Monitor functional requirements
- ◆ **Add Next Page support?**
- ◆ **Add restart mechanism**
- ◆ **Debug of new conventions/variables/state machine handshakes/etc. is extremely painful**
 - Only serves to lengthen balloting process
 - Takes resources from other, more valuable areas
 - Trust me, I've done it! Save yourself the pain!
- ◆ **The real issue is specification complexity, not cost or implementation complexity**

Alternative Solution

- ◆ **Cut out Arbitration and other relevant text from Clause 28 and drop into Clause 37**
- ◆ **Remove “Link Monitor” state diagram from Clause 36**
- ◆ **Modify Arbitration diagram to interface to PCS correctly**
 - **Minimal effort, in fact its already basically done!**
 - **Include Next Page function**
 - **Sanitize variable definitions and usage**
- ◆ **Need different mechanism for link restart mechanism**

Solution (cont.)

- ◆ **Provide consistent management interface**
 - Add mapping from Configuration words to AutoNeg Advertisement Register, AutoNeg Link Partner Ability register, AutoNeg Expansion Register, etc.

What does it buy us?

- ◆ **Smaller standards debug phase**
- ◆ **Consistent management interface**
- ◆ **Consistent with established Link Configuration architecture (Auto-Negotiation)**
- ◆ **Algorithm is well known - implemented and simulated by many vendors**
- ◆ **Next Page function (i.e. “infinite” code space)**

Next Page - The Misunderstood Function

- ◆ **Big mistake in 100BASE-T is that its optional**
 - Came historically late in the process
 - Required on both ends to be usable
 - Gigabit has the advantage of Next Page being well defined
- ◆ **Provides software upgradable feature addition**
- ◆ **Provides inter-vendor and intra-vendor compatibility independent of standards process**
- ◆ **Provides an “escape” when (not if) we create uses for all bits**
- ◆ **Copper and fiber fundamental capabilities need never diverge**

Gigabit Arbitration Diagram

