

802.3bj Draft 1.3 Comment #191

AN_LINK.indication primitive when using CAUI and XLAUI

IEEE P802.3bj Task Force

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Comment #191

Cl 92	SC 92.3	P 161	L 13	# 191
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Comment Type	ER	Comment Status	X	
Is the text in this subclause sufficient (and/or necessary) for the 100G case? If the PCS is co-located with the AN and PMD then support of AN_LINK.indication probably goes without saying. What happens if the PCS is in another device connected through CAUI? Is there an interface through the PMA and RS-FEC sublayers? if not, how can this primitive be implemented?				
<i>SuggestedRemedy</i>				
Either delete this subclause, or clarify how a non-co-located PCS should communicate, or both.				
<i>Proposed Response</i>				
<i>Response Status</i> ○				

Relevant to new PHYs specified in Clause 92, 93, and 94.

Also, points out an error in legacy Clauses 84 and 85.

When the PCS is on a different device than the PMD/AN the link_status indication must be sent from one device (with the PCS) to the other (with the AN) via a currently undefined signaling mechanism.

802.3-2012 40G/100G references

82.6 Auto-Negotiation

The following requirements apply to a PCS used with a 40GBASE-KR4 PMD, 40GBASE-CR4 PMD, or 100GBASE-CR10 PMD where support for the Auto-Negotiation process defined in Clause 73 is mandatory. The PCS shall support the primitive AN_LINK.indication(link_status) (see 73.9). The parameter link_status shall take the value FAIL when PCS_status=false and the value OK when PCS_status=true. The primitive shall be generated when the value of link_status changes.

84.3 PCS requirements for Auto-Negotiation (AN) service interface

The PCS associated with this PMD is required to support the AN service interface primitive AN_LINK.indication defined in 73.9. (See 82.6.)

85.3 PCS requirements for Auto-Negotiation (AN) service interface

The PCS associated with this PMD is required to support the AN service interface primitive AN_LINK.indication defined in 73.9. (See 82.6.)

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92.3 PCS requirements for Auto-Negotiation (AN) service interface

The PCS associated with this PMD is required to support the AN service interface primitive AN_LINK.indication defined in 73.9. (See 82.6.)

93.3 PCS requirements for Auto-Negotiation (AN) service interface

The PCS associated with this PMD is required to support the AN service interface primitive AN_LINK.indication defined in 73.9. (See 82.6.)

94.3.2 PCS requirements for Auto-Negotiation (AN) service interface

The PCS associated with this PMD is required to support the AN service interface primitive AN_LINK.indication defined in 73.9. (See 82.6.)

802.3-2012 Clause 49/72 (10G) references

49.2.16 Auto-Negotiation for Backplane Ethernet

The following requirements apply to a PCS used with a 10GBASE-KR PMD. Support for the Auto-Negotiation process defined in Clause 73 is mandatory. The PCS shall support the primitive AN_LINK.indication(link_status) (see 73.9). The parameter link_status shall take the value FAIL when PCS_status=false and the value OK when PCS_status=true. The primitive shall be generated when the value of link_status changes.

72.3 PCS requirements for Auto-Negotiation (AN) service interface

The PCS associated with this PMD shall support the AN service interface primitive AN_LINK.indication defined in 73.9. (See 49.2.16.)

Clause 73 AN_LINK definition

73.9 Technology-Dependent interface

The Technology-Dependent interface is the communication mechanism between each technology's PCS and the Auto-Negotiation function. Auto-Negotiation can support multiple technologies, all of which need not be implemented in a given device. Each of these technologies may utilize its own technology-dependent link integrity test function.

73.9.1 AN_LINK.indication

This primitive is generated by the PCS to indicate the status of the underlying medium. The purpose of this primitive is to give the Auto-Negotiation function a means of determining the validity of received code elements.

73.9.1.1 Semantics of the service primitive

`AN_LINK.indication(link_status)`

The `link_status` parameter shall assume one of two values: `OK` or `FAIL`, indicating whether the underlying receive channel is intact and enabled (`OK`) or not intact (`FAIL`).

73.9.1.2 When generated

A technology-dependent PCS generates this primitive to indicate a change in the value of `link_status`.

73.9.1.3 Effect of receipt

The effect of receipt of this primitive shall be governed by the state diagram of Figure 73–10.

Clause 73 – Management control

73.10.1 State diagram variables (Section 5, page 521)

`mr_restart_negotiation`

Controls the entrance to the TRANSMIT DISABLE state to break the link before Auto-Negotiation is allowed to renegotiate via management control.

Values: `false`; renegotiation is not taking place.
`true`; renegotiation is started.

`mr_restart_negotiation` is input from management to force the AN state machine to Auto-Negotiation Enable state, thus restarting the link.

Clause 73 AN State Machine

link_status_[HCD]

-link status from the PHY type determined by AN priority resolution.
 -HCD = highest common denominator
 -comes from AN_LINK(link_status).indication which is driven by the PCS

The AN_GOOD state is when negotiation is complete and successful.

When link_status changes to FAIL, a link restart is triggered by going to TRANSMIT_DISABLE state.

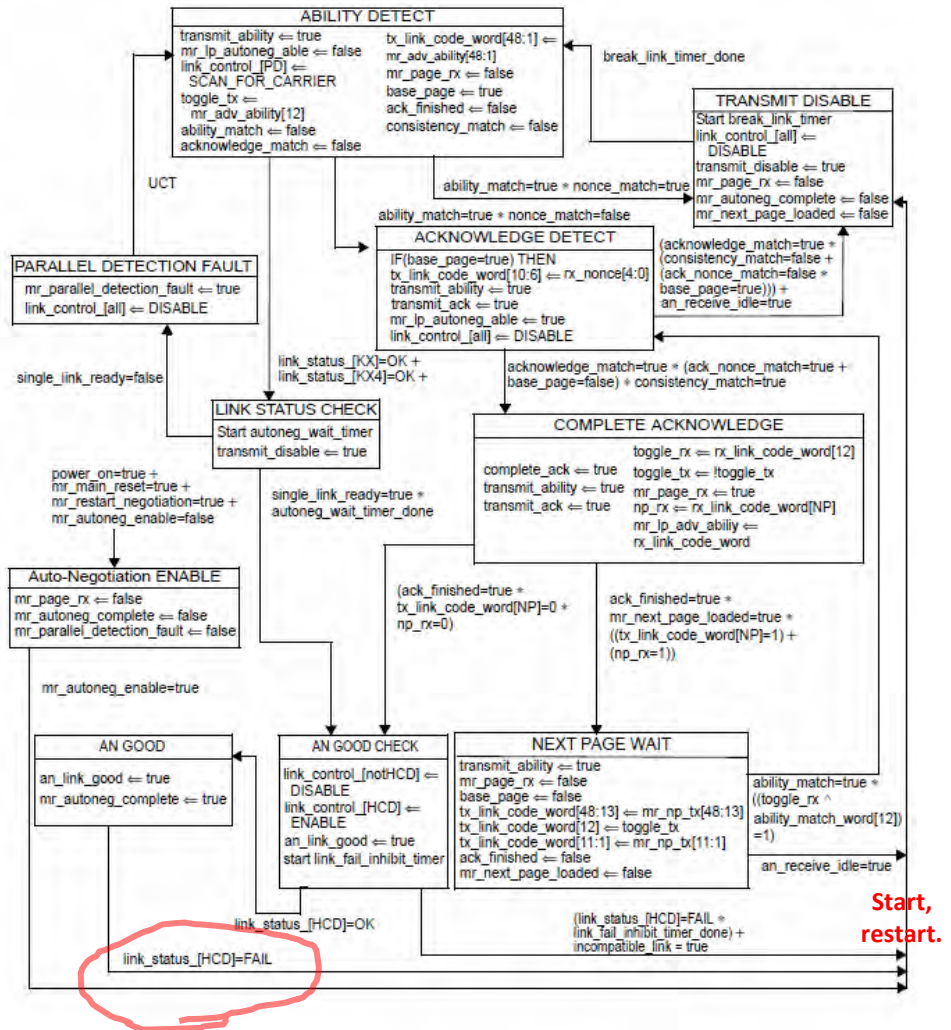
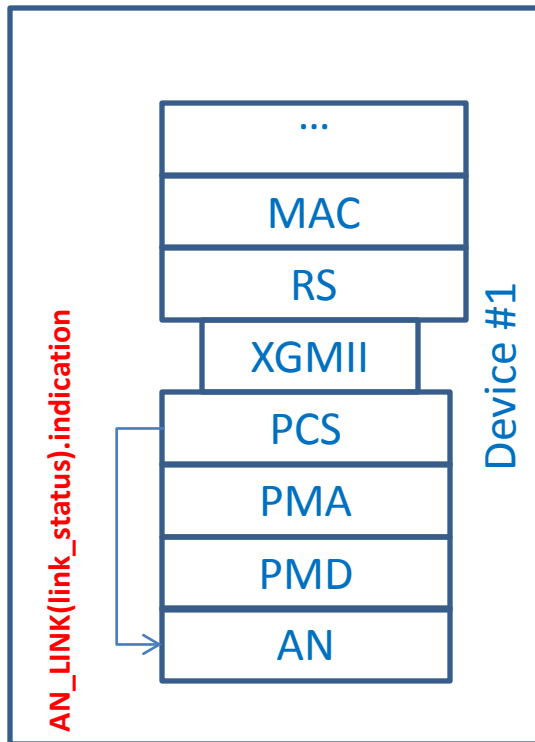
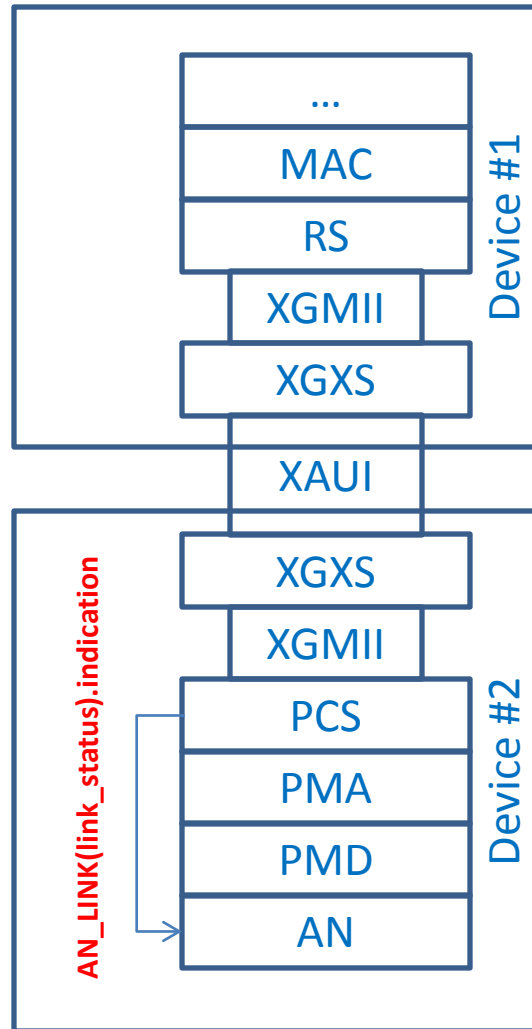


Figure 73–11—Arbitration state diagram

10G Layer Architecture

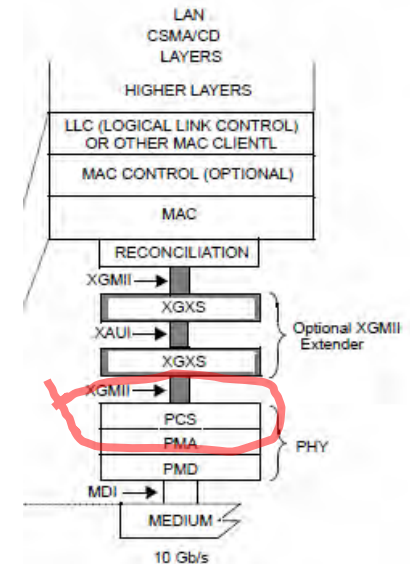


PHY on single device



PHY on two devices

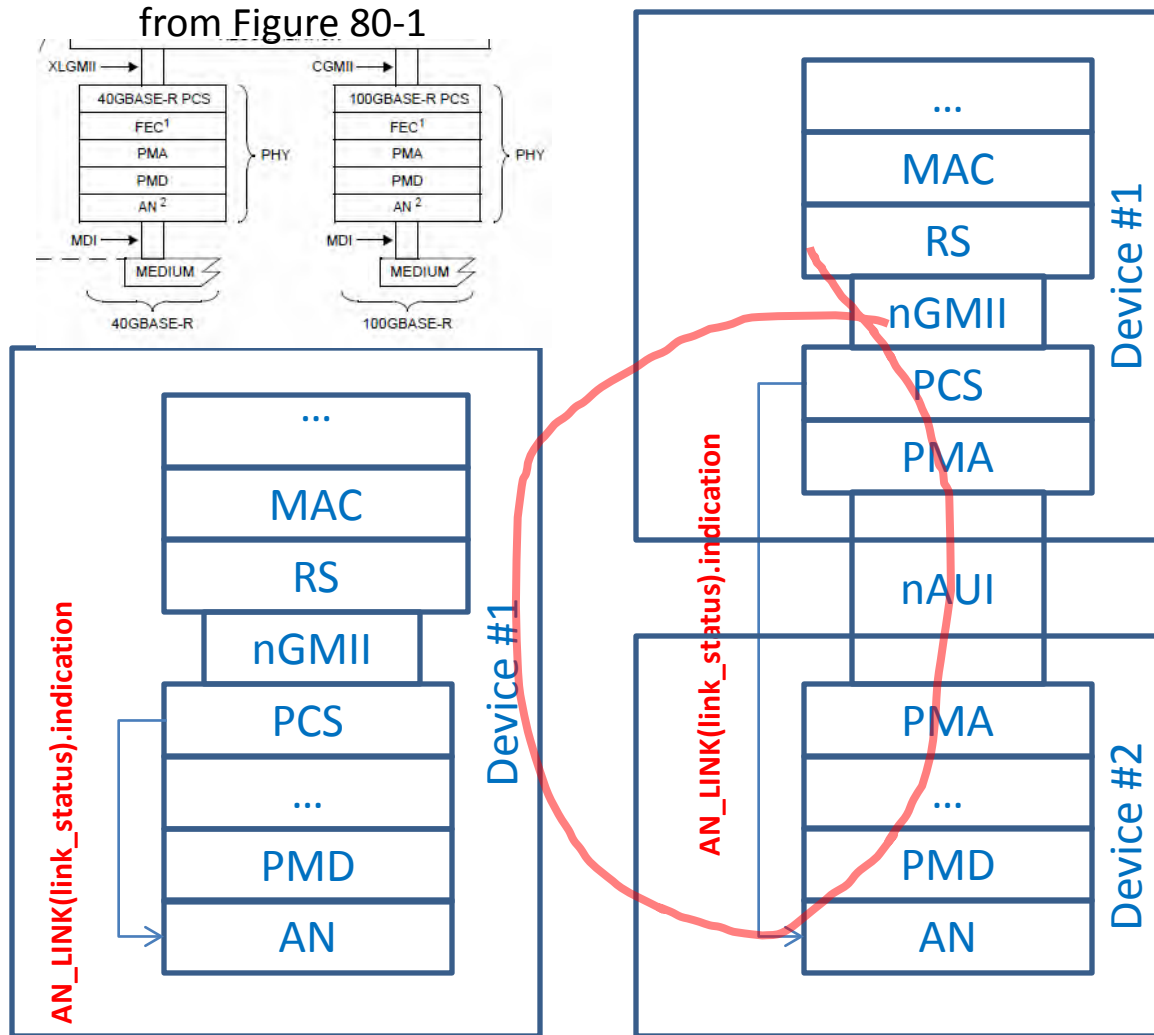
from Figure 47-1



When PHY spans more than one device, interconnect is via XAUI. The PCS is still on the device with AN.

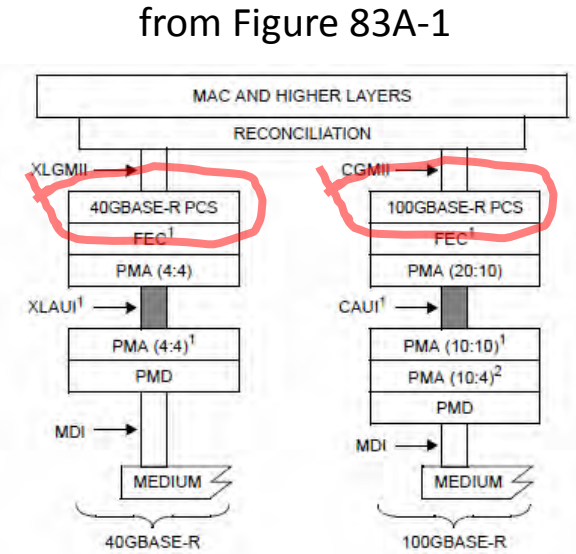
No problem!

40G/100G layer architecture



PHY on single device

PHY on two devices



When PHY spans more than one device, interconnect is via nAUI. PCS is on a different device than AN.

How to connect the two together?

Possible solutions

- PMD/AN device can detect remote fault on TX path.
 - Requires the equivalent of PCS and RS functions.
- Specify new in-band remote fault signal for nAUI.
 - Significant upgrade.
- Specify an out-of-band link_status electrical signal.
 - Straight-forward to specify and implement.
 - May not be compatible with pin-limited interfaces, e.g., modules.
- Specify that pervasive management is responsible for relaying the link_status state to the AN sublayer.
 - The pervasive management is implicit in 802.3 PHYs.
 - Is it acceptable to specify use of the pervasive management for signaling between sublayers.

Proposed solution

Add the following paragraph to 84.3, 85.3, 92.3, 93.3, 94.3.2.

The <PHY type> PHY may be extended using the {XLAUI, CAUI} as a physical instantiation of the inter-sublayer service interface between devices. If {XLAUI, CAUI} is instantiated, the AN_LINK(link_status).indication must be relayed from the device with the PCS sublayer to the device with the AN sublayer by means at the discretion of the implementer. As examples, the implementer may employ use of pervasive management or employ a dedicated electrical signal to relay the state of link_status as indicated by the PCS sublayer on one device to the AN sublayer on the other device.