Supporting Materials for comment #105

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Sep 6, 2016

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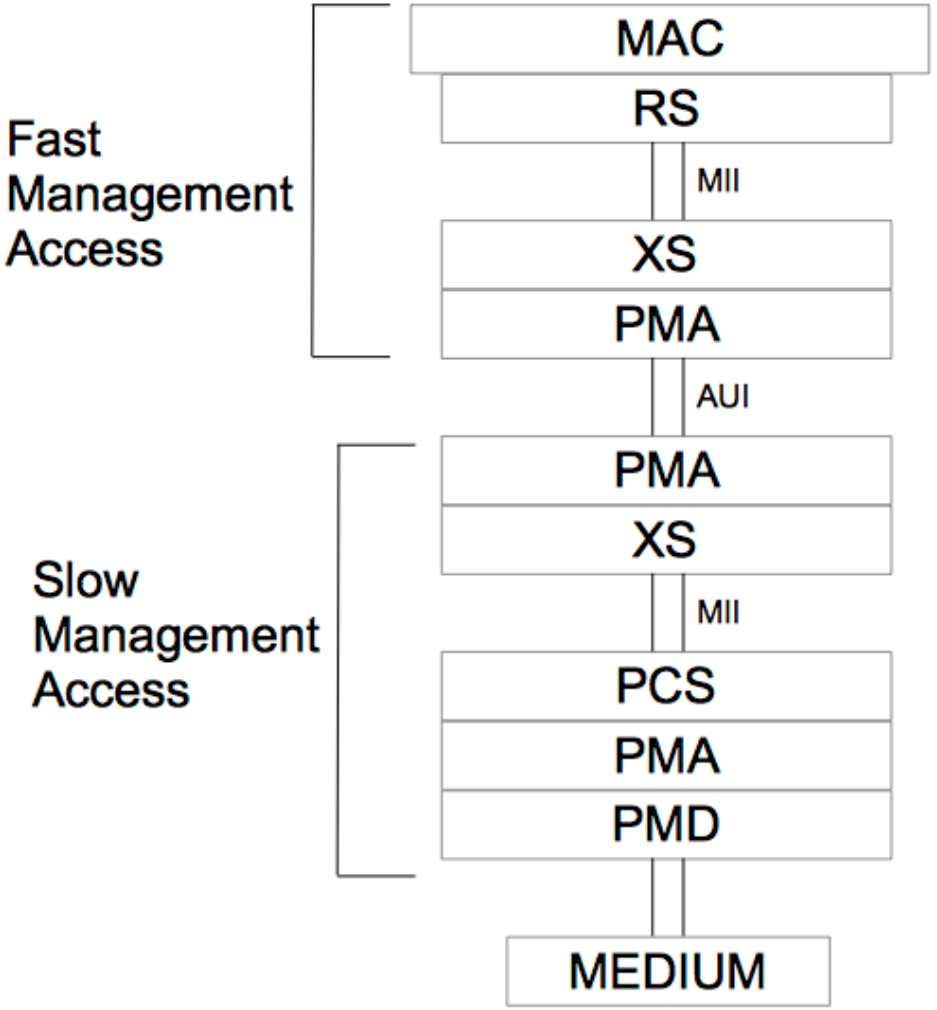
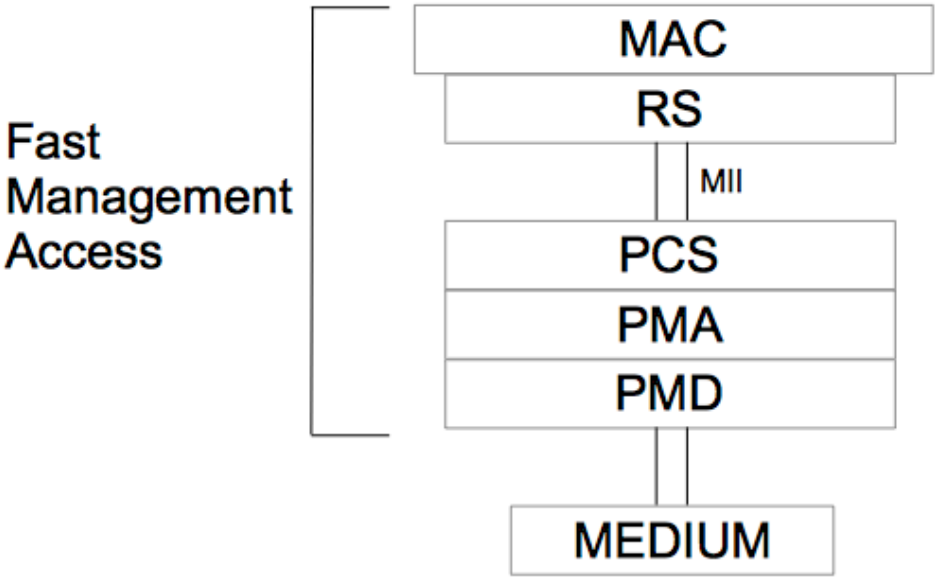
Comment #105

- When the degrade features is not-supported or enabled in the XS layer, I would think we'd want it to just echo the PCS value all the way back to the RS.

Assumed Software Access speed





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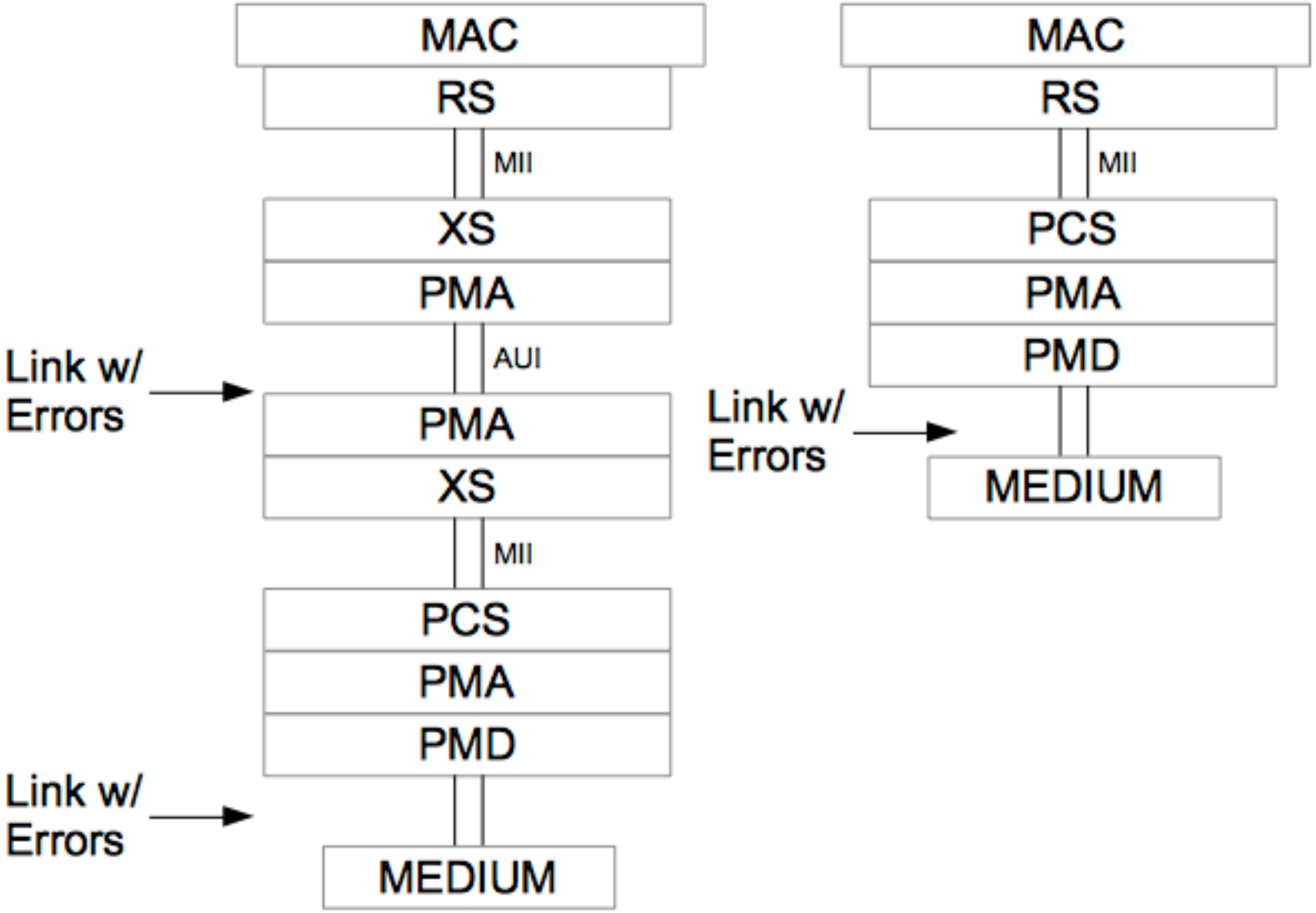
AUI and Medium links can have errors



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How I think Degrade should work

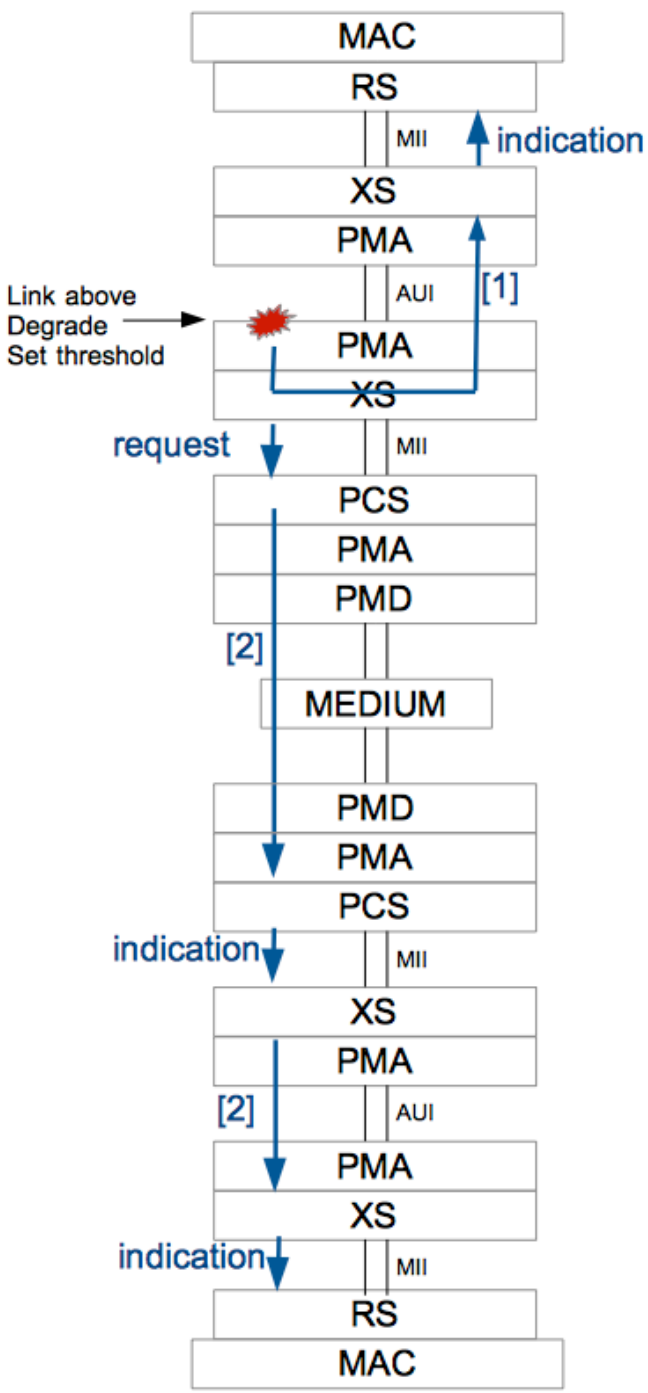
There are 2b of information being passed.

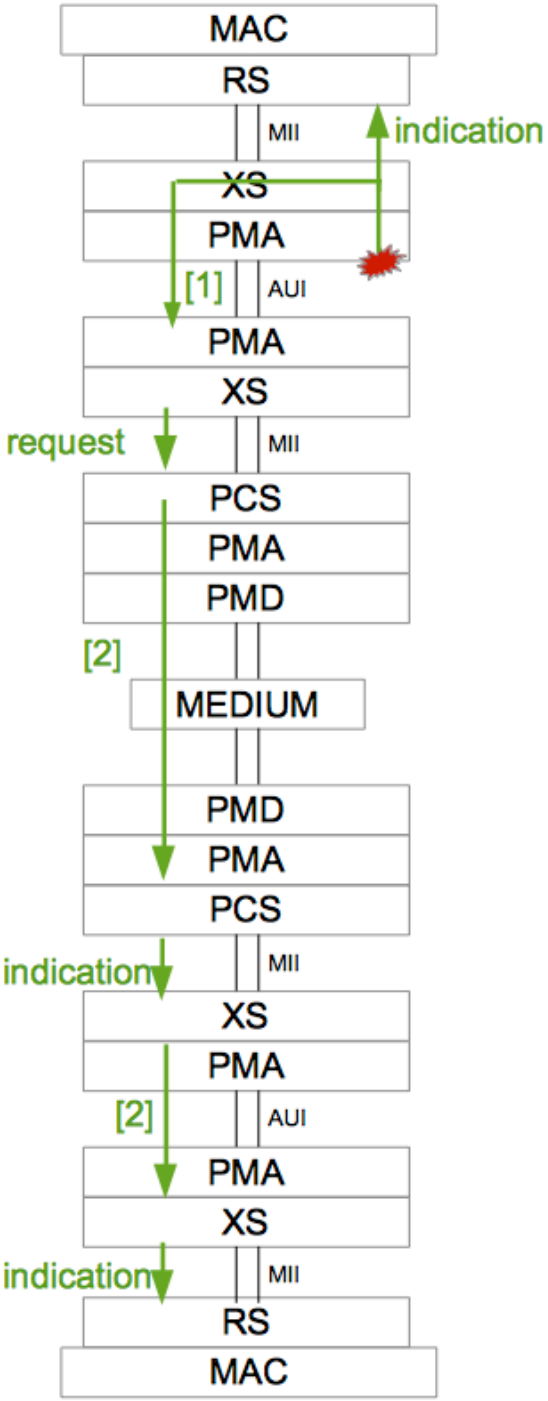
1) Degrade condition exist on the link
2) Degrade condition exists on local board XS link

Current text uses tx_am_sf<2> to denote link has error and tx_am_sf<1> for local XS.

However current PCS text does not repeat an XS based degrade onto the remote partner. (On next slide Blue line would only loopback and not proceed to PCS)

Since notifications to management are best done at the MAC/RS I believe it's best to repeat the information all the way there. Next set of slides depict how signaling could be done to repeat the degrade notice all the way to the MAC/RS.


MAC
RS
MII
indication
XS
PMA
AUI
[1]
Link above
Degrade
Set threshold
PMA
XS
request
MII
PCS
PMA
PMD
[2]
MEDIUM
PMD
PMA
PCS
indication
MII
XS
PMA
[2]
AUI
PMA
XS
indication
MII
RS
MAC


MAC
RS
MII
indication
XS
PMA
[1]
AUI
PMA
XS
request
MII
PCS
PMA
PMD
[2]
MEDIUM
PMD
PMA
PCS
indication
MII
XS
PMA
[2]
AUI
PMA
XS
indication
MII
RS
MAC

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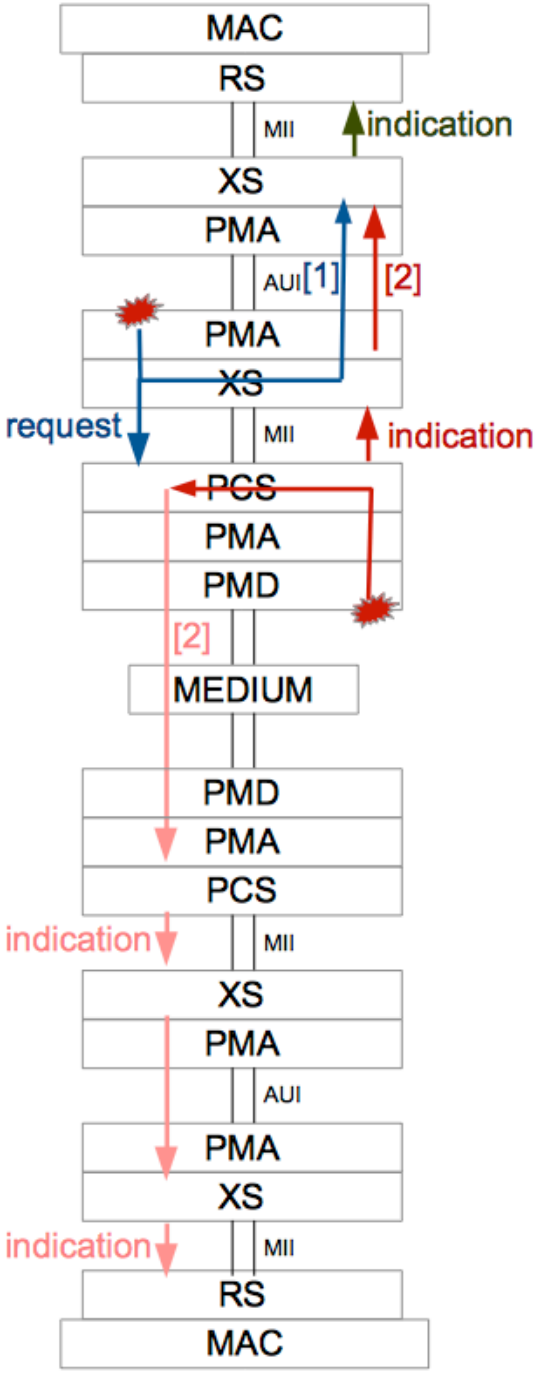
MAC
RS
MII
indication
XS
PMA
AUI
[1]
[2]
PMA
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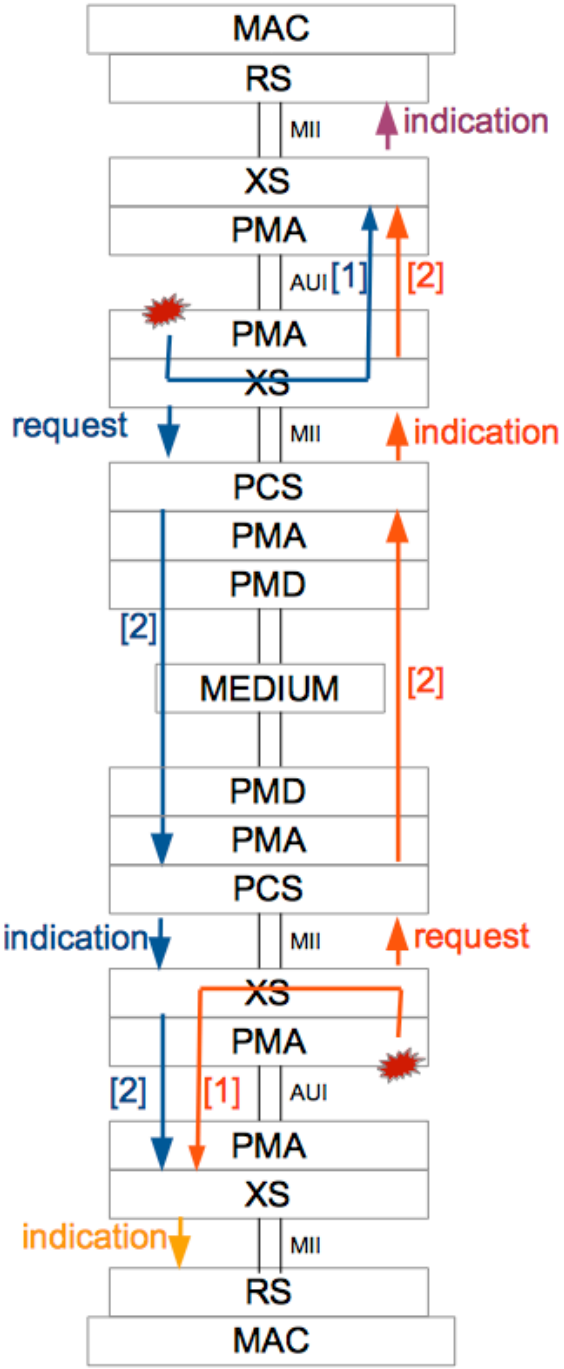
request
MII
indication
PCS
PMA
PMD
[2]
MEDIUM
PMD
PMA
PCS
indication
MII
XS
PMA
AUI
PMA
XS
indication
MII
RS
MAC


MAC
RS
MII
indication
XS
PMA
AUI
[1]
[2]
PMA
XS
request
MII
indication
PCS
PMA
PMD
[2]
MEDIUM
[2]
PMD
PMA
PCS
indication
MII
request
XS
PMA
[2]
[1]
AUI
PMA
XS
indication
MII
RS
MAC

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Local Link has error indicator

- Indication to RS can be used to trigger a discovery of error.
- Local XS check rx_sf_am<2,1> and local_degrade_set to determine next step.
  - Local_degrade_set and rx_sf_am<2:1> == 0 just local Rx
  - rx_sf_am<1> == 1, then other side of XS link has issue
  - Rx_sf_am<2> == 1, then PCS or remote end has issue. Check PCS
- Check PCS
  - Local_degrade_set and rx-sf_am<2> == 0 just local Rx
  - Rx_sf_am<2> == 1 then remote side has issue

How to implement this

- Amend the MII interface for 200/400G to have
  - Link Degrade status flag (DEGRADE.indication)
  - Link Degrade input flag (DEGRADE.request)
- PCS MII section sets DEGRADE.indication when it detects a degrade occurrence or rx_sf_am<2> is set.
- PCS tx_sf_am<2> is set if either DEGRADE.indication (incoming data causing degrade) or DEGRADE.request (adjacent layer says to degrade)
- XS MII section sets DEGRADE.indication when it detects a degrade occurrence or if either rx_sf_am<2> or rx_sf_am<1> is set
- XS tx_sf_am<1> is set when it detects a degrade occurrence

Conclusion

- We can remove the concept of DTE & PHY XS and just have an XS.
- Both ends I believe want to know when a degrade occurs anywhere in the link. Currently in a PCS attached to RS setup both sides know if either issues degrade, but if an XS is in the path and the error is on the XS link, only 1 side is informed.

- Following sides are details on how to implement the high level concepts.

Clause 117

117.4a DEGRADE Assertion and Detection

Degrade assertion and detection function provide a mechanism to pass the state of the degrade signal across the MII interface. The Degrade signaling provides status to the RS and a method for the XS layer to pass degrade signaling to the PCS.

117.4a.1 DEGRADE messages

DEGRADE.indication(DEGRADE_INDICATION)

A primitive that indicates to the Degrade Client the PHY has detected the assertion of Degrade.

Values: DEASSERT: The link is operating below degrade thresholds

ASSERT: The link is operating above degrade thresholds

DEGRADE.request(DEGRADE_REQUEST)

The DEGRADE.request parameter can take on one of two values: ASSERT or DEASSERT. ASSERT forces the transmission of the degrade status to the remote partner. DEASSERT allows transmission of the degrade status to be based on the PHY status.

Clause 117

117.5.4.7 Degrade Functions

Item	Feature	Subclause	Value/ Comment	Status	Support
D1	Assertion of Degrade in the Tx Direction	117.4a	As defined by 117.4a	M	Yes
D2	Assertion of Degrade in the Rx Direction	117.4a	As defined by 117.4a	M	Yes

Clause 118

Replace 118.2 with the following slide set.

118.2 FEC Degrade

In addition to the optional FEC degrade functionality that is described in Clause 119, the 200GXS or 400GXS optionally performs the extra functions decribed in 118.2.1.

118.2.1 XS FEC Degrade signaling

When the XS 200GMII or 400GMII client is the Reconciliation Layer the variable tx_am_sf is set as follows:

tx_am_sf<2:0> = {0, FEC_degraded_SER,0}

When the XS 200GMII or 400GMII client is the PCS Layer the variable tx_am_sf is set as follows:

tx_am_sf<2:0> = {DEGRADE.indication, FEC_degraded_SER, 0}

Clause 118.2 continued

118.2.2 DEGRADE.indication

When the XS 200GMII or 400GMII client is the Reconciliation layer the DEGRADE.indication shall be set to ASSERT when FEC_degraded_SER is set, when rx_sf_am<2> is received as a 1 or when rx_sf_am<1> is received as a 1. Otherwise it is set to DEASSERT.

When the XS 200GMII or 400GMII client is the PCS layer the DEGRADE.indication shall be set by the PCS layer.

118.2.3 DEGRADE.request

When the XS 200GMII or 400GMII client is the Reconciliation layer the

DEGRADE.request shall be set by the RS layer.

When the XS 200GMII or 400GMII client is the PCS layer DEGRADE.request shall be set to ASSERT when FEC_degraded_SER is set, when rx_sf_am<2> is received as a 1 or when rx_sf_am<1> is received as a 1. Otherwise it is set to DEASSERT.

Clause 118 cont.

- Remove all references to DTE XS and convert all references of PHY XS to just XS. In all of 802.3bs (ie. Clause 45, Clause 118, etc.)

Clause 119

119.1.4.1.1 DEGRADE.indication

DEGRADE.indication shall be set to ASSERT when FEC_degraded_SER is set or when rx_sf_am<2> is received as a 1. Otherwise it is set to DEASSERT.

119.2.4.4

The transmit alignment marker status field allows the local PCS to communicate the status of the optional FEC degraded feature to the remote PCS. It is set as follows:

tx_am_sf<2:0> = {DEGRADE.request | FEC_degraded_SER, 0,0}

See 119.2.5.3 for more information on the optional FEC degrade feature.

Clause 119 cont.

- **119.6.4.1 Transmit Function**

Item	Feature	Subclause	Value/Comment	Status	Support
TF8	DEGRADE.request	119.1.4.1.1	Tx_am_sf<2> set when DEGRADE.request	M	Yes

- **119.6.4.2**

Item	Feature	Subclause	Value/Comment	Status	Support
RF8	DEGRADE.indication	119.1.4.1.2	DEGRADE.indication set when rx_am_sf<2> is recieved	M	Yes

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