



Sequence Ordered Set for 2.5GBASE-X

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William Lo, Marvell

Should Sequence Ordered Set be Removed for 2.5GBASE-X?

▶ **Sequence Ordered Set currently baselined**

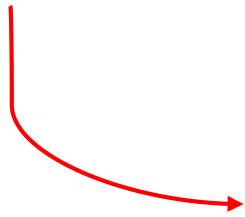
- Lo_3cb_01a_0116.pdf
- Spent extra effort to add this since 1000BASE-X PCS does not support this

▶ **Question asked in March 2016 meeting whether we really need it**

- Sequence ordered set used to pass Remote Fault and Local Fault
- Construct 2.5GBASE-X PCS never to generate Local Faults for 2.5G speed

▶ **Simplifies the PCS**

- Removes some mapping in Word encoder/decoder

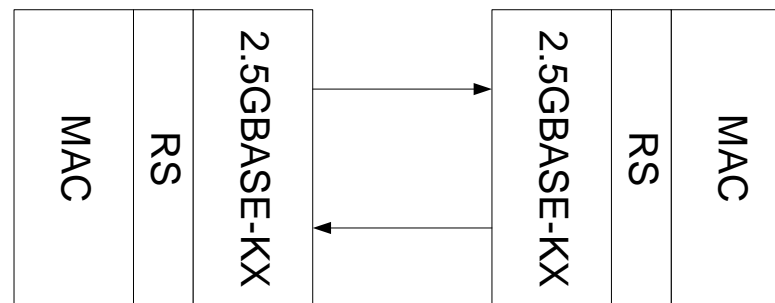


Four 2.5GPII					
GPII 0	GPII 1	GPII 2	GPII 3	Prev Word	Next Word
Data A/Err	Data B/Err	Data C/Err	Data D/Err	Not Idle	X
Data *	Data A/Err	Data B/Err	Data C/Err	Idle	X
Idle	Idle	Idle	Idle	Not Data	X
Idle	Idle	Idle	Idle	Data	X
	Idle or Carrier Extend	Idle	Idle	Data	X
Data A/Err	Data B/Err	Idle	Idle	Data	X
Data A/Err	Data B/Err	Data C/Err	Idle or Carrier Extend	Data	X
LPI	LPI	LPI	LPI	X	X
Idle	Idle	LPI	LPI	X	X
LPI	LPI	Idle	Idle	X	X
Sequence	Data S0	Sequence	Data S1	X	Sequence S2, S3
Sequence	Data S0	Sequence	Data S1	X	Not Sequence S2, S3
Sequence	Data S2	Sequence	Data S3	Sequence	X
else					

XGMII				
Byte 0	Byte 1	Byte 2	Byte 3	Prev Word
Data A/Err	Data B/Err	Data C/Err	Data D/Err	Data
SOP	Data A/Err	Data B/Err	Data C/Err	Data
Idle	Idle	Idle	Idle	Idle
Terminate	Idle	Idle	Idle	Idle
Data A/Err	Terminate	Idle	Idle	Idle
Data A/Err	Data B/Err	Terminate	Idle	Idle
Data A/Err	Data B/Err	Data C/Err	Terminate	Idle
LPI	LPI	LPI	LPI	Idle
LPI	LPI	LPI	LPI	Idle
Idle	Idle	Idle	Idle	Idle
Sequence	Data X	Data Y	Data Z	Sequence
Idle	Idle	Idle	Idle	Idle
Sequence	Data X	Data Y	Data Z	Idle
Error	Error	Error	Error	Error

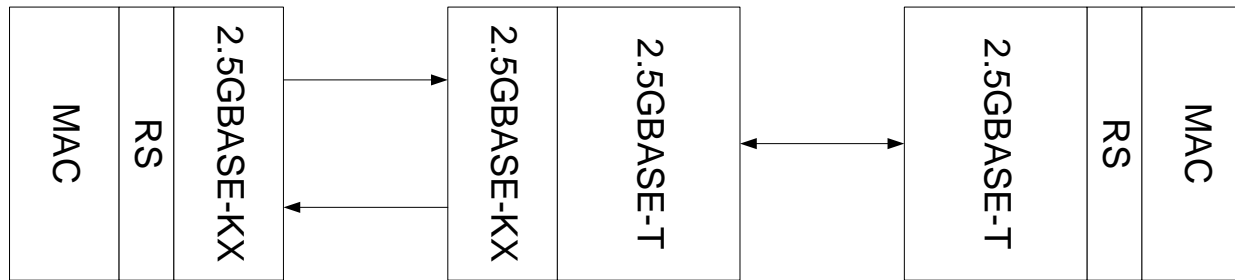
Sequence Ordered Set Avoidance

- ▶ **Clause 46.3.4 defines the Link fault signaling**
 - Local Fault
 - Remote Fault
 - Link Interruption
- ▶ **802.3bz modified Clause 46 to apply to 2.5Gb/s and 5Gb/s speeds**
- ▶ **If 2.5GBASE-X PCS never generate Local Fault, the state machine in 46.3.4 will never send a Remote Fault to the PCS.**
- ▶ **Link Interruption applies only to *GBASE-T PHYs**
- ▶ **Model below can live without sequence ordered set**
 - RS will never get triggered with link fault

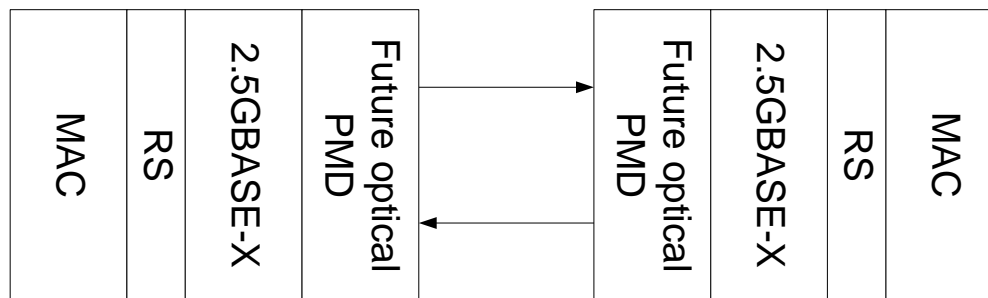


Extensibility and Futureproofing

- ▶ **If 2.5GBASE-KX is used as an extender for 2.5GBASE-T then**
 - The 2.5GBASE-T PHY can generate Local Fault and Link Interrupt
 - RS will not see this unless 2.5GBASE-KX PCS has capability to pass them



- ▶ **Current PMD is defined only for KX. If optical PMD defined later then local and remote fault would be useful to identify broken optical links.**



Recommendation

- ▶ **Keep the Sequence Ordered Set as defined in the 2.5GBASE-X PCS baseline**
 - Compatible with 2.5X speedup of 1000BASE-X PCS that does not support this (See Annex 127B)

- ▶ **Logic to implement is minimal**
 - Few extra elements in the encoder and decoder table
 - Extra state variable to track in the encode/decode
 - State diagram modified to recognize sequence ordered set

- ▶ **Gives flexibility and future proof the PCS**

- ▶ **Gives 2.5GBASE-X PCS same link fault signaling capability as 5GBASE-R, 10GBASE-R, and higher speeds**

THANK YOU