OAM Frame Proposal

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OAM Frame Proposal

- Natalie/Mike proposed to change the OAM frame from 1GBase-T style to a single 10-bit word on September 5, 2018.
  - http://www.ieee802.org/3/ch/public/adhoc/wienckowski_3ch_01_090518.pdf
- This presentation is an extension on what was already proposed
- We propose that a set of 6 MDIO registers be designated which are continuously transmitted to the link partner via the OAM. Some of these bits are predefined and some can be filled by firmware as vendor specific bits.
- And a set of 6 registers which store the received OAM result.
- The register bits are defined on the following pages

OAM Transmit MDIO Registers

Register	Bit definition		
OAM0	9:7	R/W	Reserved
	6:4	R/W	Local Status<2:0> 000: Invalid 001: Trouble
	3	RO	Unused, Ping Rx in receive register
	2	R/W self clear	Ping Tx
	0:1	R/W	Local SNR<1:0> 00: will drop link within 2-4ms 01: refresh SNR too low, exit LPI 10: SNR is marginal 11: SNR is good
OAM1	9:0	R/W	Reserved
OAM2	9:0	R/W	Vendor defined
OAM3	9:0	R/W	Vendor defined
OAM4	9:0	R/W	Vendor defined
OAM5	9:0	R/W	Vendor defined

OAM Receive MDIO Registers

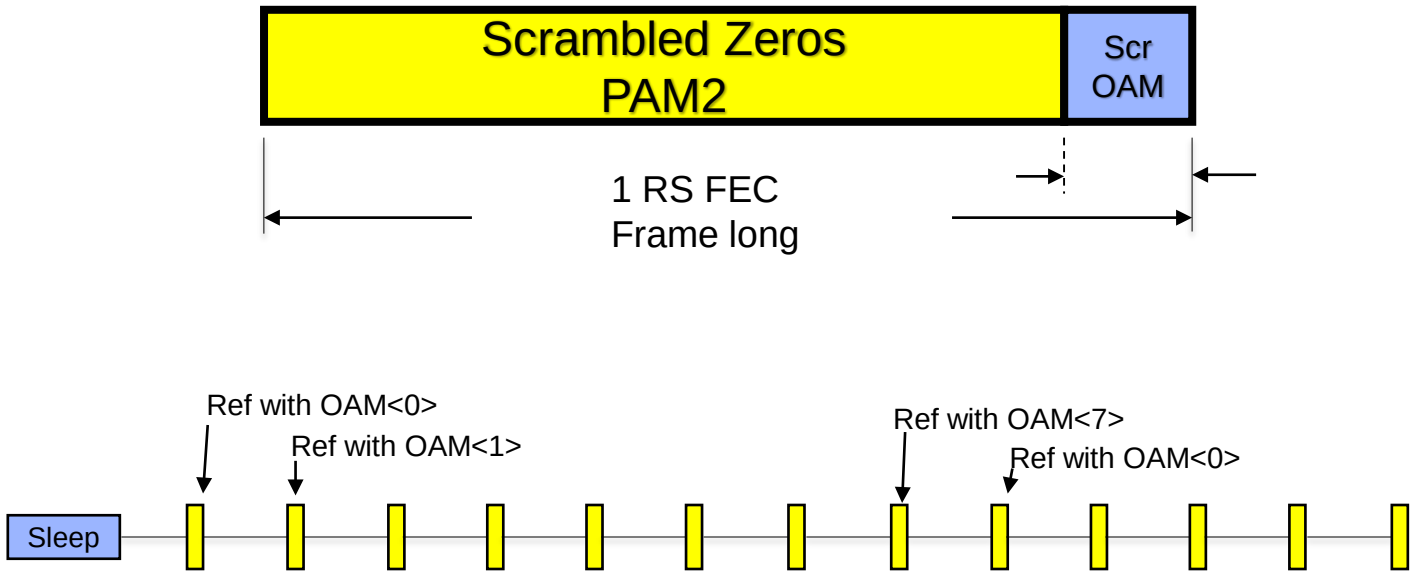
Register	Bit definition		
OAM0	9:7	RO	Reserved
	6:4	RO	Link Partner Status<2:0> 000: Invalid 001: Trouble
	3	RO	Ping Rx
	2	RO	Unused, Ping Tx in Transmit register
	0:1	RO	Link Partner SNR<1:0> 00: will drop link within 2-4ms 01: refresh SNR too low, exit LPI 10: SNR is marginal 11: SNR is good
OAM1	9:0	RO	Vendor defined
OAM2	9:0	RO	Vendor defined
OAM3	9:0	RO	Vendor defined
OAM4	9:0	RO	Vendor defined
OAM5	9:0	RO	Vendor defined

OAM Frame Proposal

- We need to send six10-bit words across the link for OAM.
- Noise environment is low level Gaussian, with 60-110ns burst every 100us
- We do not want to use interleaving during LPI refresh as it requires sending four full RS frames per refresh (assuming interleave of 4)
- To protect the OAM, we will Reed Solomon encode the OAM using RS(8,6) resulting in 8 words OAM<7:0>
- In LPI mode
  - we send only a single 10 bit word per refresh as the last 10-bits of the PAM2 sequence by xor'ing with the training scrambler result.
  - This allows full recovery of the frame since only one word can be corrupted by noise.
  - Frame boundary can easily be recovered by RS decode
- In data mode
  - In order to ease implementation of frame start recovery, we will use this same OAM<7:0> in data mode where the OAM is embedded as the last data byte of the RS(360,326) frame

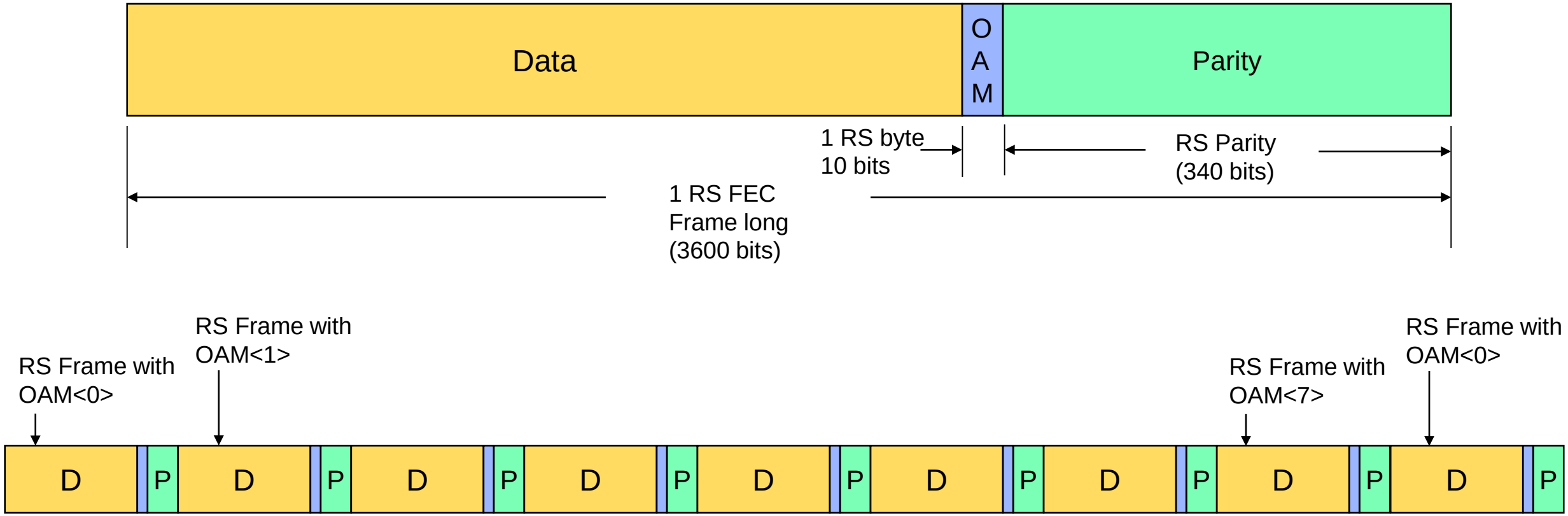
OAM during LPI

- The OAM is an RS(7,5) packet of data which is 7 words of 10-bits each. During LPI, a single 10-bit word is sent as the last ten symbols of refresh



OAM during data mode

- In data mode, the resulting RS encoded OAM<6:0> transmitted one word per RS frame



Thank you.

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