

OAM Details

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1000BASE-T1 OAM Frame

- 12 symbol sequence (only D7-D0 of Symbols 0 to 9 visible in Clause 45 registers)
- Parity bit D8 used to delineate frame boundary
- If EEE enabled then OAM must be implemented supporting SNR<1:0>

	D8	D7	D6	D5	D4	D3	D2	D1	D0	
Symbol 0	Even Parity	Reserved	Reserved	Reserved	Reserved	PingRx	PingTx	SNR<1>	SNR<0>	
Symbol 1	Odd Parity	Valid	Toggle	Ack	TogAck	Message_Number<3:0>				
Symbol 2	Odd Parity	Message<0><7:0>								
Symbol 3	Odd Parity	Message<1><7:0>								
Symbol 4	Odd Parity	Message<2><7:0>								
Symbol 5	Odd Parity	Message<3><7:0>								
Symbol 6	Odd Parity	Message<4><7:0>								
Symbol 7	Odd Parity	Message<5><7:0>								
Symbol 8	Odd Parity	Message<6><7:0>								
Symbol 9	Odd Parity	Message<7><7:0>								
Symbol 10	Odd Parity	CRC16						first bit		
Symbol 11	Odd Parity	final bit	CRC16							

Figure 97-15—OAM Frame

1000BASE-T1 OAM Not Implemented

- OAM symbol set to all zeros (Clause 97.3.8.2.1)
- OAM enabled/disabled during training (Clause 97.4.2.4.5)
 - Training bit Oct10<0>
 - Enabled only if both PHYs advertise it

D8	D7	D6	D5	D4	D3	D2	D1	D0
0	0	0	0	0	0	0	0	0

Current MGBASE-T1 OAM Proposal

- Mandatory set of information to exchange (D6 to D0)

OAM Frame Proposal

D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
P2	P1	RSVD	Status<2>	Status<1>	Status<0>	Ping RX	Ping TX	SNR<1>	SNR<0>

Parity: P1 and P2 set based on the values of D0 – D7

$$P1 = D0 \oplus D1 \oplus D2 \oplus D4 \quad \text{(Equations need to be optimized)}$$

$$P2 = \neg (D3 \oplus D5 \oplus D6 \oplus D7)$$

RSVD: Not currently used, always transmit as 0

- http://grouper.ieee.org/groups/802/3/ch/public/adhoc/wienckowski_3ch_01_090518.pdf

Proposed OAM Solution for MGBASE-T1

- Redefine Training bit Oct10<0>
 - From: OAM enabled/disabled
 - To: Enhanced OAM/Basic OAM
 - Enhanced OAM only if both PHYs advertise it
 - Basic OAM is mandatory, Enhanced OAM is optional
- Basic OAM – Insert in to payload every RS frame
 - Set D9 to 1 to indicate basic mode
(not really needed since mode is known from Oct10<0> during training)

D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
1	Even Parity	Reserved	Status<2>	Status<1>	Status<0>	Ping Rx	Ping Tx	SNR<1>	SNR<0>

Proposed OAM Solution

- Enhanced OAM
 - Same as in 1000BASE-T1 except 10-bit symbols and Status<2:0>
 - Decouple EEE from OAM. SNR<1:0> is available in either mode.

	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
Symbol 0	0	Even Parity	Reserved	Status<2>	Status<1>	Status<0>	Ping Rx	Ping Tx	SNR<1>	SNR<0>
Symbol 1	0	Odd Parity	Valid	Toggle	Ack	TogAck	Message_Number<3:0>			
Symbol 2	0	Odd Parity	Message<0><7:0>							
Symbol 3	0	Odd Parity	Message<1><7:0>							
Symbol 4	0	Odd Parity	Message<2><7:0>							
Symbol 5	0	Odd Parity	Message<3><7:0>							
Symbol 6	0	Odd Parity	Message<4><7:0>							
Symbol 7	0	Odd Parity	Message<5><7:0>							
Symbol 8	0	Odd Parity	Message<6><7:0>							
Symbol 9	0	Odd Parity	Message<7><7:0>							
Symbol 10	0	Odd Parity	CRC16							
Symbol 11	0	Odd Parity	CRC16							

Changes Required in OAM Clause

- Enhanced OAM mode
 - No changes to 1000BASE-T1 state machine except 10th bit tweaks
 - Minor textual changes to change from 9-bit to 10-bit
 - Update register 3.2308.6:4 and 3.2313.6:4 to reflect Status<2:0>
 - Update parity bit definition to cover 10 bits (optional to do)
- Basic OAM mode
 - Need to add some description on how the Status<2:0>, Ping Rx, Ping Tx, and SNR<1:0> are exchanged as state machines in figures 97-17 and 97-18 describing this mechanism are not implemented

THANK YOU