

# OAM, Auto-Negotiation and Far-End Fault

R0-0  
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# Problem

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- **EFM OAM requires unidirectional traffic in order to communicate Remote Fault**
- **Clauses 24, 28, 36 & 37 currently don't allow this:**
  - 100BASE-TX Auto-Negotiation**
  - 100BASE-FX Far-End Fault**
  - 1000BASE-X Auto-Negotiation**

# Proposal

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- Let ANEG/FEF run at powerup
- Let MAC OAM negotiation run next
- If OAM is desired then set the variable EFM\_OAM
- EFM\_OAM disables effects of ANEG/FEF (see later slides)
- While EFM\_OAM is set to TRUE, users should set `mr_autoneg_enable/mr_an_enable=FALSE`.

# EFM\_OAM for 100BASE-TX

- **Change input to Transmit state diagram (Fig.24-8) from link\_status to tx\_link\_status, where tx\_link\_status is forced to OK when efm\_oam=TRUE, otherwise it takes the value of link\_status.**
- **This enables the Transmit state diagram to leave the IDLE state and forward data from the MII.**
- **Force link\_control=ENABLE**
- **This disables any effect of the ANEG machine in Clause 28.**
- **Both of these changes enable the Link Monitor state diagram's (Fig.24-15) link\_status variable to reflect the value of signal\_status.**
- **EFM\_OAM should turn off the ANEG machine**

# EFM\_OAM for 100BASE-FX

- **Change input to Far-End Fault Generate state diagram (Fig. 24-16) from `signal_status` to `tx_signal_status`, where `tx_signal_status` is forced to ON when `efm_oam=TRUE`, otherwise it takes the value of `signal_status`.**
- **This enables the Far-End Fault Generate state diagram to forward bits from the Transmit Bits state diagram (Fig. 24-7)**
- **For 100BASE-FX, the only allowed value for `link_control` is ENABLE since ANEG doesn't exist.**
- **The Link Monitor state diagram's `link_status` variable reflect the value of `signal_status` or faulting. If `efm_oam` is true on both ends of the link then faulting should always be FALSE.**

# EFM\_OAM for 1000BASE-X

- **Force xmit=DATA**
- **This enables the PCS transmit ordered\_set state diagram (Fig.36-5) to get to the XMIT\_DATA state and forward data from the GMII.**
- **The Auto-Negotiation state diagram (Fig. 37-6) should be forced to the AN\_ENABLE state. If efm\_oam gets cleared for any reason, ANEG begins again.**

# Keep EFM\_OAM=TRUE until:

- Link is down for timeout (?)
- Management decides to start over
- Detect faulting=TRUE in 100BASE-FX

This isn't guaranteed to occur from a link partner that has been reset

- Detect Link Pulses in 100BASE-TX
- Detect Configuration ordered\_sets in 1000BASE-X