

802.3ct SIGNAL_DETECT modifications

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Relevant text

- Signal Detect is defined in 802.3ct D2.0 154.5.4
- Signal Detect maps to SIGNAL_OK to indicate a failed signal

154.5.4 PMD global signal detect function

The PMD global signal detect function shall report the state of SIGNAL_DETECT via the PMD service interface. The SIGNAL_DETECT parameter is signaled continuously, while the PMD:IS_SIGNAL indication message is generated when a change in the value of SIGNAL_DETECT occurs. The SIGNAL_DETECT parameter defined in this clause maps to the SIGNAL_OK parameter in the inter-sublayer service interface primitives defined in 154.2.

SIGNAL_DETECT shall be a global indicator of the presence of the optical signal. The value of the SIGNAL_DETECT parameter shall be generated according to the conditions defined in Table 154–5. The PMD

Various implementations of the Signal Detect function are permitted by this standard, including implementations that generate the SIGNAL_DETECT parameter values in response to the average optical power of the modulated optical signal.

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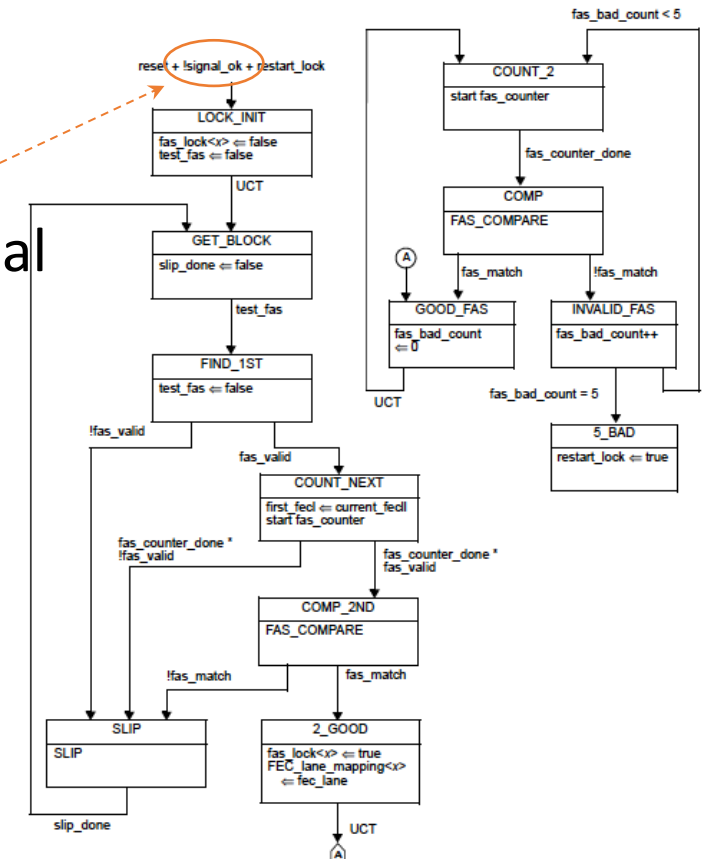


Figure 153–7—SC-FEC synchronization state diagram

Comments related to SIGNAL_DETECT

Comment list on this topic in 802.3ct D2.0:

111, 110, 69, 104, 105, 79, 80

Issues

- SIGNAL_DETECT based on optical power as defined in 802.3ct 2.0 has two issues
 - In an amplified application the integrated ASE can prevent reliable SIGNAL_DETECT operation → This is the case for Clause 154 optical specs
 - An additional unamplified application is defined in 802.3ct, with an Rx sensitivity that could be lower than the SIGNAL_DETECT threshold for the primary application
- Details of these two issues are provided in
 - http://www.ieee802.org/3/ct/public/20_07/maniloff_3ct_01a_200716.pdf

802.3 Definitions

- Signal Detect is defined in 52.4.4

The PMD Signal Detect function shall report to the PMD service interface, using the message PMD_SIGNAL.indication(SIGNAL_DETECT) which is signaled continuously. PMD_SIGNAL.indication is intended to be an indicator of optical signal presence. If the MDIO interface is implemented, then

As an unavoidable consequence of the requirements for the setting of the SIGNAL_DETECT parameter, implementations must provide adequate margin between the input optical power level at which the SIGNAL_DETECT parameter is set to OK, and the inherent noise level of the PMD due to cross talk, power supply noise, etc.

- When SIGNAL_DETECT = FAIL, traffic will be squelched, as shown in Fig 153.7
- For unamplified applications, the SIGNAL_DETECT threshold is set to the launch power of OFF transmitter power level

Proposed Remedy

- As SIGNAL_DETECT is not reliable using average power detection:
 - The proposed solution is to have only one row in Table 154-5, indicating the value “OK” for SIGNAL_DETECT, removing the other 2 rows for value “FAIL” and “Unspecified”.
 - Add appropriate wording in the text around Table 154-5 to clarify the reason why this is done.
- Lane Lock at SC FEC will be used to verify a valid data signal

PMD:IS_SIGNAL.indication

- An inter sublayer indication of SIGNAL_DETECT status is defined between the PMD and SC FEC sublayers
- This connection will be maintained, with the value fixed at OK
- This maintains common IS connections as other clauses

The SIGNAL_OK parameter of the PMD:IS_SIGNAL.indication primitive corresponds to the variable SIGNAL_DETECT parameter as defined in 154.5.4. The SIGNAL_DETECT parameter can take on one of two values: OK or FAIL. When SIGNAL_DETECT = FAIL, the rx_symbol parameters are undefined.

NOTE—SIGNAL_DETECT = OK does not guarantee that the rx_symbol parameters are known to be good. It is possible for a poor quality link to provide sufficient light for a SIGNAL_DETECT = OK indication and still not meet the BER defined in 154.1.1.

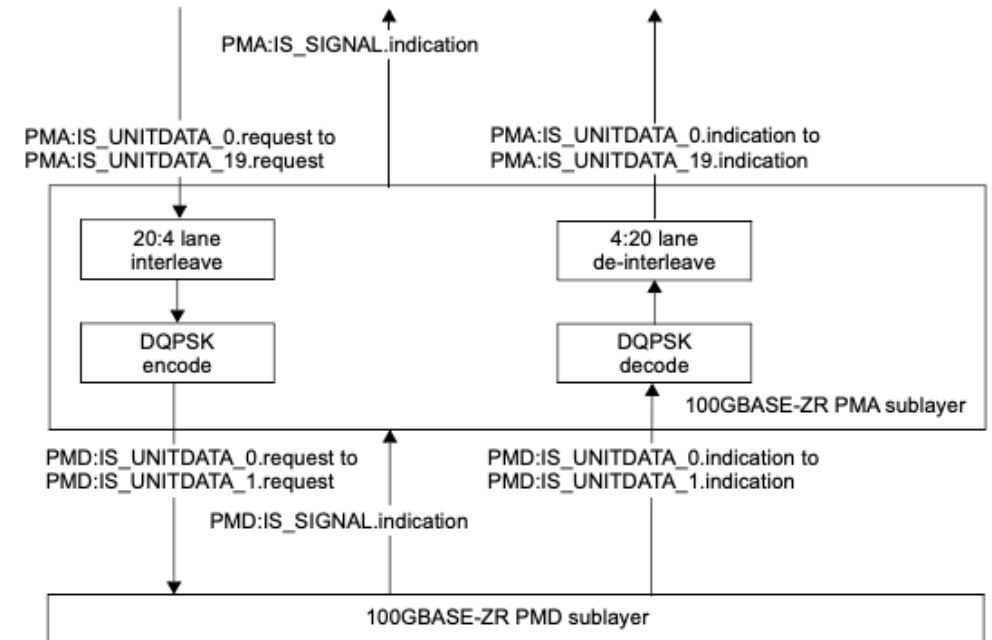


Figure 153–9—100GBASE-ZR PMA functional block diagram

Thanks!