Cl **01** *SC* *P* *L* # **1**

Wali Rousta

Comment Type **T** *Comment Status* **D**

Hi
I want to know why I cannot view all the edited pages per our last meeting in Irvine.
Thanks

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **35** *SC* **35.4.2.1** *P* **35.23+** *L* # **2**

Brad Booth Jato Technologies

Comment Type **E** *Comment Status* **D**

Figures 35-17, 35-18, 35-19, 35-20 and 35-21 sit in the middle of the paragraph.

SuggestedRemedy

Move figures to be between paragraphs.

Proposed Response *Response Status* **O**

Cl **36** *SC* **36.2.5.1.6** *P* **36.27** *L* **13** # **8**

Brad Booth Jato Technologies

Comment Type **E** *Comment Status* **D**

PMA_UNITDATA.request is not sent by the PMA Transmit process, it is sent to the PMA Transmit process.

SuggestedRemedy

Change to read:
"A signal sent to the PMA Transmit process conveying the next code-goup ready for transmission over the medium (see 36.3.1.1)."

Proposed Response *Response Status* **O**

Cl **36** *SC* **36.2.5.2.1** *P* **36.29** *L* # **9**

Brad Booth Jato Technologies

Comment Type **T** *Comment Status* **D**

PMA_UNITDATA.request is not sent by the PMA Transmit process, it is sent to the PMA Transmit process. The current state machine diagrams treats PMA_UNITDATA.request as an input to the transmit code-group state machine when in fact it should be generated by the state machine, as is done in clause 23 and clause 40.

SuggestedRemedy

Add the following line to the last line of each state that assigns a value to tx_code_group:
"PMA_UNITDATA.request(tx_code_group)"

Change PMA_UNITDATA.request on all state transition arrows to read:
"cg_timer_done"

Add new section on page 36.27 to read:
"36.2.5.1.7 Timer"

cg_timer

A continuous free-running timer.

Values: The condition cg_timer_done goes true upon timer expiration.

Restart when: Immediately after expiration; restarting the timer resets the condition cg_timer_done.

Duration: 8 ns nominal.

cg_timer shall be generated synchronously with GTX_CLK (see tolerance required for GTX_CLK in 35.4.2.3. In the PCS transmit code-group state diagram, the message PMA_UNITDATA.request is issued concurrently with cg_timer_done."

Proposed Response *Response Status* **O**

Cl **36** *SC* **36.3.1.1** *P* **36.35** *L* **41** # **10**

Brad Booth Jato Technologies

Comment Type **E** *Comment Status* **D**

PMA_UNITDATA.request is not used by the PCSTransmit process, it is generated by the PCS Transmit process.

SuggestedRemedy

Change sentence to read:
"PMA_UNITDATA.request is generated by the PCS Transmit process."

Proposed Response *Response Status* **O**

Cl **36** *SC* **36.3.2.2** *P* **36.37** *L* **9** # **11**

Brad Booth Jato Technologies

Comment Type **T** *Comment Status* **D**

Previous comment requesting addition of cg_timer will define the clock frequency of PMD_UNITDATA.request.

SuggestedRemedy

Delete the sentence.

Update the PICS entry PMT1 to reference subclause 36.2.5.1.7.

Proposed Response *Response Status* **O**

Cl **36** *SC* **Figure 36-7a, 36-7b** *P* **36.30** *L* # **14**

Chandra Moturu Compaq Computer Co

Comment Type **E** *Comment Status* **D**

Shape of polygons to indicate "outgoing" arcs is confusing as their pointed end is facing "incoming".

SuggestedRemedy

Change shape of polygons (labeled A on page 36.30 and B,C,D on page 36.31) where the pointing end faces toward the bottom of the page, as indicated below.

Proposed Response *Response Status* **O**

Cl **38** *SC* **38.2.4** *P* **38.4** *L* **35** # **7** *Proposed Response* *Response Status* **O**

howard frazier cisco systems

Comment Type **T** *Comment Status* **D**

The text and table describing the Signal Detect function is unnecessarily complex, and subject to misinterpretation. The essential requirements are not obvious, and there is a certain amount of redundancy.

SuggestedRemedy

Replace all of 38.2.4 with the following:

38.2.4 PMD signal detect function

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

The SIGNAL_DETECT parameter shall be set to FAIL under the conditions defined in Table 38-1. The SIGNAL_DETECT parameter shall be set to OK under the conditions defined in Table 38-1, provided that the optical input is generated by an appropriate optical transmitter which is transmitting 1000BASE-X code-groups as defined in this standard.

Under all other conditions, the value of the SIGNAL_DETECT parameter is unspecified. This standard imposes no response time requirements on the generation of the SIGNAL_DETECT parameter.

Table 38-1 SIGNAL_DETECT value definition

Receive Conditions	Value
Input optical power < -30dBm	FAIL
-30dBm < Input optical power < Receive Sensitivity	unspecified
Input optical power > Receive Sensitivity	OK

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.

Various implementations of the Signal Detect function are permitted by this standard, including implementations which generate the SIGNAL_DETECT parameter values in response to the amplitude of the 8B/10B modulation of the optical signal and implementations which respond to the average optical power of the 8B/10B-modulated optical signal.

Cl **38** *SC* **38.2.4** *P* **38.4** *L* **39** # **4**

Pat Gilliland Methode Electronics

Comment Type **T** *Comment Status* **D**

Regarding clause 38.2.4 (PMD signal detect function) lines 39-40 state,

"SIGNAL_DETECT shall be set to OK when the circuitry receives a valid optical signal."

1.0 Unfortunately, most optical transceivers already have a Signal_Detect output. Signal_Detect as implemented in these transceivers cannot reliably indicate the presence of a "valid optical signal". Therefore, we need to take some steps to avoid confusion.

If you are well versed in the subject of communications system design, you may want to skip or merely scan the material between the dotted lines and go right to the conclusion.

1.1 There are two basic types of signal detect circuits. Both types of signal detect circuitry are insufficient to reliably establish the presence of a "valid optical signal". Some Signal_Detect outputs simply indicate the presence of light above a certain level. These circuits are very easy to design and implement. They only require a bias resistor, a reference voltage and a comparator. They will still respond positively even if there is no modulation of the optical input (i.e. CW optical input).

1.2 Another type of signal detect responds to the amplified electrical output of the optical detector. These are further divided into three subgroups. The first is a simple AC rectifier circuit which compares the AC rectified voltage against the DC average value of the detected and amplified optical input. When the difference exceeds a certain threshold, a comparator sets the SD logical output to "TRUE".

1.2.1 Type 1 as described above suffers from a different problem. If there is no optical modulation, the circuit could respond to random noise or spurious signals generated in the receiver amplifier chain. Because the receiver needs to respond to optical signals at or below 10uW, there is a tremendous amount of power gain (in a typical receiver ~ 60dB) depending on the choice of AGC or limiting amplifier. Since the Type 1 SD circuit cannot discriminate between noise, spurious signals (oscillations) and valid optical pulses, it is possible for the Type 1 SD to generate false positives.

1.2.2 Type 2 attempts to resolve some of the problems of the Type 1 circuit by adding a matched filter to the AC rectifier circuit. This optimal bandpass filter passes the 800ps GbE pulse relatively unattenuated, and filters out noise and spurious signals not in the passband of the filter. This type of circuit greatly increases the reliability of the SD logic.

Of course, Type 2 has its limits. None of the currently available optical transceivers employ such a filter. Additionally, not all valid optical pulses are 800ps in duration. By choosing the appropriate time constant for the AC rectifier circuit, we can deal with this problem.

More worrisome is the potential for auto-induced false triggers of the SD detect output in a transceiver module. Because of the very high gains in the small package, there is the possibility of crosstalk from the transmitter coupling into the receiver chain and triggering the SD comparator.

1.2.3 Type 3 adds circuitry to detect a characteristic pattern in the signal. In addition to the matched filter, we can add a multi input AND gate which looks in parallel at the serial data output as it streams by. When a common pattern is detected (e.g. K28.5), the SD logic is set to "TRUE". This type of SD circuit has the greatest processing gain of all, and is inherently the most reliable.

Even the Type 3 has limitations which make it in practice no better than the Type 2 when implemented inside the small optical transceivers common in today's implementations. Because of the intimate association of an optical transmitter and receiver in a small package, a degree of cross coupling can be expected. The high gain of the receiver creates the possibility of a false SD "TRUE" output.

Since none of the present transceiver manufacturers implement the more reliable Type 2&3 circuits anyway, we must distinguish between the SD as presently implemented and the one which is desired to be "set to OK when the PMD circuitry receives a valid optical signal."

SuggestedRemedy

1.3 I propose the following solution. Leave Signal_Detect as it is. Since it is defined somewhat differently by all the transceiver manufacturers anyway, allow each to implement it according to their current rules.

If we use the capabilities of our SERDES chips we have both the Type 2&3 Signal_Detect already implemented. Deserializers

implement clock recovery with a phase locked loop. Most of these PLLs use a phase-frequency discriminator. Most also have a Lock_Detect output which indicates if the PLL has acquired phase lock on the incoming signal. This is the equivalent of a Type 2 SD as described above. The PLL is operating as a high quality synchronous filter (translate: bandpass filter in the frequency domain). Therefore, Lock_Detect indicates the presence of 800ps pulses.

Deserializers also commonly implement a Comma_Detect circuit to assist in framing. This type of data pattern detect is the same as Type 3 described above.

Ultimately, the most reliable Signal_Detect would be a logical combination of an optical power detect from the optical module and the Lock_Detect and Comma_Detect outputs of the SERDES. I am not 100% sure all SERDES vendors employ a phase/frequency discriminator in their PLL circuits, so we could eliminate the Lock_Detect if it is not universal. We could also leave open the option of optical power detect or rectified AC signal detect since there is no universal agreement on this topic.

I propose we rename the 38.2.4 clause "PMD Signal Integrity" and define it as the logical "AND" of Comma_Detect from the SERDES and Signal_Detect from the optical transceiver.

Then it will be possible to claim as we desire in line 40 the existence of a "valid optical signal".

Proposed Response *Response Status* **O**

Cl **38** *SC* **38.2.4** *P* **38.4** *L* **40** # **5**

Pat Gilliland Methode Electronics

Comment Type **T** *Comment Status* **D**

There is a major contradiction in the text in regard to received power threshold for SIGNAL_DETECT. In the current document it states on page 38.4 line 40,

"SIGNAL_DETECT shall be set to FAIL when the received optical power is below -30 dBm."

In the table on page 38.5 line 22 there is note b which states,

"b. The SIGNAL_DETECT values in this table are generated by processing the 8B/10B character signal through an AC coupled receiver. The SIGNAL_DETECT values should respond to the amplitude of the 8B/10B modulation signal and not respond directly to the average optical power received."

These two statements are contradictory. In one place we are asking for a threshold which is based on the optical power of -30dBm, yet we specify in note b the SIGNAL_DETECT shall not respond to optical power.

The desired -30dBm limit is most certainly indicative of the average optical power. Optical power meters do not respond to peak power. Optical power meters do respond directly to average optical power.

SuggestedRemedy

Eliminate note b. The particular method used to derive the SIGNAL_DETECT power indication is of no consequence to the end user. The optical receiver vendors are responsible for engineering the necessary circuits. The preferrable way is a direct indication of optical power.

Proposed Response *Response Status* **O**

Cl **38** *SC* **38.2.4** *P* **38.4** *L* **41** # **6**

Pat Gilliland — Methode Electronics

Comment Type **T** *Comment Status* **D**

The statement I object to is,

"Examples of a FAIL condition are when the link is unplugged or the transmitter to which it is attached is changed to the OFF state."

Any reference to an "OFF" state for the optical transmitter anticipates there is some mechanism for creating such a state.

The vast majority of optical transceivers being sold into the GbE market today have no such "OFF" control inputs.

SuggestedRemedy

Remove any references to an "OFF" state for an optical transmitter in the standard. Line 41 should read,

"An example of a FAIL condition is when the link is unplugged."

Proposed Response *Response Status* **O**

Cl **38** *SC* **38.5** *P* **38.11** *L* **19** # **13**

Del Hanson — Hewlett-Packard Co.

Comment Type **E** *Comment Status* **D**

During the editing process for D4.2, the total jitter column for TP3 was mistakenly listed as 480 ps rather than 408 ps. The TP3 total jitter of 0.510 UI parameter is correct; 0.510*800 ps = 408 ps.

SuggestedRemedy

On page 38.11, Line 19, change 480 to 408.

Proposed Response *Response Status* **O**

Cl **38** *SC* **38.6.3** *P* **38.12** *L* **4** # **12**

Del Hanson — Hewlett-Packard Co.

Comment Type **E** *Comment Status* **D**

During the editing process for D4.2, the test pattern to be used for extinction ratio measurements was mistakenly changed from "repeating K28.7" to "36A.3". It should have been changed to "36A.2". Maintaining the note on line 7 referencing K28.7 confirms that there was no intent to change the line code.

SuggestedRemedy

On page 38.12, Line 4, change 36A.3 to 36A.2.

Proposed Response *Response Status* **O**

Cl **38** *SC* **38.6.3** *P* **38.12** *L* **7** # **3**

Brad Booth — Jato Technologies

Comment Type **E** *Comment Status* **D**

Note references K28.7, but K28.7 has been removed from proceeding paragraph.

SuggestedRemedy

Delete or update note.

Proposed Response *Response Status* **O**