

IEEE 802.3 Interpretations Report

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Dallas, TX

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Interpretations Status

- 2 new interpretation received

1-07/06 - 1000BASE-X IFG encoding rules

2-07/06 - 10GBASE-T MDI impedance balance

Available on Interpretations area of web site

[HTTP://www.ieee802.org/3/interp/index.html](http://www.ieee802.org/3/interp/index.html)

Request 1-11/06

Interpretation Number: 1-11/06
Topic: 1000BASE-X IFG encoding rules
Relevant Clause: Clause 36
Classification:

Interpretation Request

1. The specific designation of the standard, including the year of publication.

IEEE Std 802.3-2002

2. The specific subsection being questioned.

Sections 36.2.4.14 and 36.2.4.14.1, and 36.2.5.2.1.

3. The applicable conditions for the case in question.

I would like to submit a couple of interpretation requests of the IEEE Std 802.3-2002 Standard to the attention of the IEEE802.3 WG. These interpretations affect the way the minimum interFrameGap (IFG) is calculated, and consequently, what the maximum data rate will be in a 1GbE link when even- or odd-size frames are transmitted.

Statement 1

At the beginning of page 47 in Section 36.2.4.14 End_of_Packet delimiter (EPD) the document reads:

‘The receiver considers the MAC interpacket gap (IFG) to have begun two octets prior to the transmission of /I/. For example, when a packet is terminated by EPD, the /T/R/ portion occupies part of the region considered by the MAC to be the IFG.’

Request 1-11/06 (Continued)

Statement 2

The next Section 36.2.4.14.1 EPD Rules paragraph c) reads as follows:

'1) if /R/ is transmitted in an even numbered code-group position, the PCS appends a single additional /R/ to the code-group stream to ensure that the subsequent /I/ is aligned on an even-numbered code-group boundary and EPD transmission is complete;'

Interpretation Request 1:

In accordance with Statement 1 the receive considers that the IFG starts two octets prior to /I/. Also, per Statement 2 if the /R/ is transmitted on an even boundary and extra /R/ is appended. If an extra /R/ is appended, is Statement 1 still valid, i.e., IFG starts two bytes prior to /I/?

Interpretation Request 2:

Statement 2 uses the word "appends" which in accordance with the Webster dictionary means "to add as a supplement". If I implement a design per Statement 2, I would be adding one extra octet to the IFG for odd-size frames and, in turn, slowing the data rate. For example, if the transmitter is sending even-size frames at full rate, the minimum IFG would be 12 octets ($T/R + 10 I/s$). If the transmitter is sending odd-size frames at full rate the minimum IFG would be 13 octets ($T/R/R + 10 I/s$). Was this the intention when the document was generated?

If not, the word "appends" should be substituted by "replaces" in which case the IFG for full rate odd-size frames should be 12 octets ($T/R/R + 9 I/s$).

In relationship to the same subject, Figure 36-5 shows the transitions from EPD2_NOEXT and EPD3 to XMIT_DATA after the last /R/ is transmitted, however it does not show, for each case, the minimum number of /I/s before the next START_OF_PACKET.

Therefore it is still not clear whether the minimum number of /I/s in the IFG after $T/R/R$ is 9 or 10 for maximum transmission rate.

Request 2-11/06

Interpretation Number: 2-11/06
Topic: MDI impedance balance
Relevant Clause: Clause 55
Classification:

Interpretation Request

This is a request for interpretation of subclause 55.8.2.2 of the recently published 10GBASE-T standard, IEEE Std 802.3an-2006.

Subclause 55.8.2.2 states:

Impedance balance is a measure of the impedance-to-ground difference between the two MDI contacts used by a duplex link channel and is referred to as common-mode-to-differential-mode impedance balance. The common-mode-to-differential-mode impedance balance, $Z_{\text{bal}}(f)$, of each channel of the MDI shall meet the relationship:

$$Z_{\text{bal}}(f) \geq \begin{cases} 48 & 1 \leq f < 30 \\ 44 - 19.2 \left(\frac{f}{50} \right) & 30 \leq f \leq 500 \end{cases} \quad (55-55)$$

where f is the frequency in MHz when the transmitter is transmitting random or pseudo random data.

Request 2-11/06 (continued)

Equation 55-55 therefore provides the limit to which MDI impedance balance must be equal to or exceed. When however this limit line is plotted it passes through zero at 120MHz, representing it would appear no limit, and then continues to be increasingly negative after that.

On comparison with equivalent cabling specification it would appear that the equation is missing a $\log(10)$ frequency dependency. This seems to be confirmed by the presentation 'Impedance Balance' given by Terry Cobb at the July 2005 meeting [http://www.ieee802.org/3/an/public/jul05/cobb_1_0705.pdf]. Based on this information it appears that the equation should actually read:

$$Z_{\text{bal}}(f) \geq \begin{cases} 48 & 1 \leq f < 30 \\ 44 - 19.2 \log_{10} \left(\frac{f}{50} \right) & 30 \leq f \leq 500 \end{cases}$$

Please could you confirm if this is correct.

Request 1-07/06 in Ballot

Interpretation Number: 1-07/06
Topic: 10GBASE-X Physical Coding Sublayer (PCS)
Relevant Clause: Clause 48
Classification:

- Question 1: IEEE 802.3ae-2002, Clause 48.2.6.1.4, cvtx_terminate definition
- Question 2: IEEE 802.3ae-2002, Clause 48.2.6.2.1, transmit process
- Question 3: IEEE 802.3ae-2002, Clause 46.2.1, interframe and 48.2.4.2.3 idle cell insertion/deletion
- Question 4: IEEE 802.3ae-2002, Clause 46.2.6.1.3, deskew error definition
- Question 5: IEEE 802.3ae-2002, Figure 48-7, PCS synchronization state diagram

IEEE 802.3 Interpretation Request 1-07/06 D1.0

Working Group ballot results

Ballot opened 31st Aug 2006, closed 19th September 2006

Comments received: 31

	#	%		Status
		Actual	Require	
Abstain	25	24.0	< 30	PASS
Disapprove with comment	0*	-	-	-
Disapprove without comment	0	-	-	-
Approve	79	100	≥ 75	PASS
Ballots returned	104	51.5	≥ 50	PASS
Voters	202	-	-	-

* Based on comment responses the 1 Disapprove flipped

Knoxville interim meeting report

- Met Wednesday 20th September
 - Thanks to those that attended
- Reviewed Interpretation Request 1-07/06 /D1.0
- Responded to 31 comments

E (Editorial)	24
ER (Editorial required)	0
T (Technical)	6
TR (Technical required)	2

- Based on comment responses the 1 disapprove flipped
- Issued recirculation ballot on D1.1
- Ballot opened 30th Oct 2006, **closes 13th November 2006**

Plans for the week

- Meet this week
 - Resolve comments on 1-07/06 (10GBASE-X)
 - Review requests and draft responses
- Present draft responses to closing plenary
 - Three way vote, either:
 - Approve proposed response
 - Reject proposed response
 - Send proposed response out for Working Group Ballot