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2 | 8802-3/802.3 REVISION REQUEST |
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4 DATE: July 22, 2016
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9 REQUESTED REVISION:
10 STANDARD: IEEE 802.3-2015
11 CLAUSE NUMBER: 90
12 CLAUSE TITLE: Ethernet support for time synchronization protocols
13 PROPOSED REVISION TEXT:
14

15 Add a NOTE to an appropriate location in clause 90 to clarify the
16 IEEE 1588 / IEEE 802.1AS message timestamp point for IEEE 802.3
17 100BASE-T.
18

19 RATIONALE FOR REVISION:
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21 As part of its revision PAR, the IEEE 1588 Working Group is resolving
22 interpretation requests received on the published standard, IEEE Std
23 1588-2008. These interpretation requests are similar to maintenance
24 requests in IEEE 802. Interpretation request #26 requests clarification
25 of the message timestamping point on IEEE 802.3 100BASE-T PHYs. The
26 request is similar to the requested clarification for multilane
27 timestamping, which is being addressed by IEEE 802.3 Maintenance. It
28 seems best for this request to be clarified in IEEE 802.3 Maintenance,
29 and not IEEE 1588.
30

31 No sense of urgency has been expressed with this request, so the
32 IEEE 802.3 is welcome to address it as convenient (e.g. next revision).
33

34 From IEEE 1588-2008 interpretation request #26:
35

36 "IEEE Std 1588-2008 clause 7.3.4.1 states that "the message timestamp
37 point for an event message shall be the beginning of the first symbol
38 after the Start of Frame (SOF) delimiter." Presumably the timestamp point
39 is thus the beginning of the first bit of this first symbol. However,
40 100Base-X uses NRZI, wherein where a polarity transition represents a
41 logical ONE, and the absence of a polarity transition denotes a logical
42 ZERO. Is the start of the first bit the point where a polarity transition
43 would occur should there be one, or mid-way between the point where a
44 polarity transition would occur in the first bit should there be one and
45 the transition of the previous bit?"
46

47 The PDF file for request #26 included a figure of a "100Base-FX frame".
48 The last symbol of the SFD is represented by "light level at output
49 connector" transitioning low-to-high, for a 5B/4B value of '1'. The light
50 level remains high until the start of the symbol for the first data bit.
51 The figure has an arrow on the left at the midpoint between the low-to-
52 high transition and the first data bit. The figure has an arrow on the
53 right at the start of the first data bit. This figure can be provided to
54 IEEE 802.3 Maintenance as needed.
55

56 A potential response was discussed in IEEE 1588 working group, but not
57 reflected in IEEE 1588-revision drafts:

1
2 "Clause 7.3.4.1 as noted defines the message timestamp point as the
3 beginning of the first symbol after the start of frame delimiter. Clause
4 7.3.4.2 states that the timestamp is referenced to the point where the
5 message timestamp point passes the clock reference plane that marks the
6 boundary between the clock and the network and illustrated in Figure 19.
7 For Ethernet this reference plane should be interpreted as a point on the
8 physical media side of the PHY and therefore the question of symbol and
9 bit boundaries in the on-the-wire encoding is important.

10
11 These encodings are not specified by IEEE Std 1588-2008 but by the
12 standards relevant to the transmission protocol used.

13
14 In the case of Ethernet IEEE Std 802.3, 24.1.4.3 states that for 100Base-
15 X the on-the-wire format uses the FDDI signaling defined in ISO/IEC 9314-
16 3:1990 and ANSI X3.263-1995 (TP-PMD). It further notes that this is NRZI
17 encoding.

18
19 In IEEE Std 802.3, 1.4.235 notes that NRZI encoding specifies that a
20 polarity transition represents a logical ONE and the absence of a
21 polarity transition denotes a logical ZERO.

22
23 The transition point for a bit value of 1 defines the bit boundaries
24 (which of course for 0s must be inferred from the last 1 transition).

25
26 These bit boundaries are to be used in determining the message timestamp
27 point.

28
29 Therefore in the figure provided by the questioner the message timestamp
30 point is the choice on the right.

31
32 This definition of bit boundaries is consistent with diagrams found by
33 searching for NRZI on the internet.

34
35 IMPACT ON EXISTING NETWORKS:

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37 None.

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40 |Please attach supporting material, if any |
41 |Submit to:- David Law, Chair IEEE 802.3 |
42 |and copy:- Adam Healey, Vice-Chair IEEE 802.3 |
43 | |
44 |At:- E-Mail: stds-802-3-maint-req@ieee.org |
45 | |
46 | +----- For official 802.3 use -----+ |
47 | | REV REQ NUMBER: 1301 | |
48 | | DATE RECEIVED: 28th October, 2016 | |
49 | | EDITORIAL/TECHNICAL | |
50 | | ACCEPTED/DENIED | |
51 | | BALLOT REQ'D YES/NO | |
52 | | COMMENTS: | |
53 +-----+
54 | For information about this Revision Request see - |
55 | http://www.ieee802.org/3/maint/requests/revision_history.html#REQ1301 |
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