802.3ba PMD test points

802.3ba Test point ad hoc

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Test point Ad hoc chair
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Presentation objectives

• Provide reference information on related 802.3 test points.

• Illustrate possible 802.3ba test points based on existing related 802.3 test points.
Test point ad hoc participants

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- David Helster Tyco Electronics (x)
- Piers Dawe Avago Technology (x)
- Tom Palkert Luxtera (x)
- John Petrilla Avago Technology (x)
- Stephen Strong Juniper Networks (x)
- Gourgen Oganessyan Quellan (x)
- Rita Horner Avago Technology (x)
- Hugh Barrass Cisco (x)
- Chris DiMinico MC Communications (x)
- Norbert Folkens JDSU
- Vittal Balasubramanian FCI USA, Inc
- Herb Van Deusen Gore (x)
- Ronald Nordin Panduit (x)
- Olindo Savi Siemon Company
- Albert Vareljian Altera Corp
- Mike Dudek JDSU (x)
- Greg McSorley Amphenol
- Adam Healey LSI
- Phil Mcclay Zarlink

Please note (x) indicates ad hoc participant acknowledged support of this report.
<table>
<thead>
<tr>
<th>40 GbE</th>
<th>100 GbE</th>
<th>802.3 test point references</th>
</tr>
</thead>
<tbody>
<tr>
<td>At least 1m backplane</td>
<td>✓</td>
<td>802.3ap - 70.6.1 Link block diagram</td>
</tr>
<tr>
<td>At least 10m cu cable</td>
<td>✓</td>
<td>10GBASE-CX4 - 54.5.1 Link block diagram</td>
</tr>
<tr>
<td>At least 100m OM3 MMF</td>
<td>✓</td>
<td>1000BASE-X - 38.2.1 PMD block diagram 10GBASE-R/W - 52.4.1 PMD block diagram 10GBASE-LX4 - 53.4.1 PMD block diagram</td>
</tr>
<tr>
<td>At least 10km SMF</td>
<td>✓</td>
<td>1000BASE-X - 38.2.1 PMD block diagram 10GBASE-R/W - 52.4.1 PMD block diagram 10GBASE-LX4 - 53.4.1 PMD block diagram</td>
</tr>
<tr>
<td>At least 40km SMF</td>
<td>✓</td>
<td>1000BASE-X - 38.2.1 PMD block diagram 10GBASE-R/W - 52.4.1 PMD block diagram 10GBASE-LX4 - 53.4.1 PMD block diagram</td>
</tr>
</tbody>
</table>
802.3ap Backplane ethernet architectural positioning

Figure 69–1—Architectural positioning of Backplane Ethernet
802.3ap Backplane link block diagram

The backplane interconnect is defined between test points TP1 and TP4.
10GBASE-CX4 relationship to OSI reference model

Figure 54-1—10GBASE-CX4 PMD relationship to the ISO/IEC Open Systems Interconnection (OSI) reference model and the IEEE 802.3 CSMA/CD LAN model

802.3ba PMD test points
10GBASE-CX4 Link diagram

PMD Service Interface

TP1

TX bit<0:3>

CX4 transmit function

SLn<p>

SIGNAL_DETECT

MDI

The electrical transmit signal is defined at the output end of the mated connector (TP2).

Signal<n>

Signal<p>

4x

Link Shield

TP2

TP3

PMD Service Interface

MDI

DLn<p>

DLn<n>

CX4 receive function including AC-coupling

TP4

PMD

Cable Assembly

All cable assembly measurements are to be made between TP1 and TP4 as shown in Figure 54–2.

PCB - Tx to connector not included in 10GBASE-CX4 link (2 in of FR4 assumed).

PCB – connector to Rx not included in 10GBASE-CX4 link (2 in of FR4 assumed).

Receiver measurements are made at the input end of the mated connector (TP3).

802.3ba PMD test points
1000BASE-X relationship to OSI reference model

**Figure 37–1—Location of the Auto-Negotiation function**

802.3ba PMD test points
TP1 and TP4 are standardized reference points for use by implementors to certify component conformance. The electrical specifications of the PMD service interface (TP1 and TP4) are not system compliance points (these are not readily testable in a system implementation). It is expected that in many implementations, TP1 and TP4 will be common between 1000BASE-SX, 1000BASE-LX, and 1000BASE-CX (Clause 39).
10GBASE-LX4 relationship to OSI reference model

Figure 53-1—10GBASE-LX4 PMD relationship to the ISO/IEC Open Systems Interconnection (OSI) reference model and the IEEE 802.3 CSMA/CD LAN model

802.3ba PMD test points
10GBASE-LX4 PMD block diagram

TP1 <0:3> and TP4 <0:3> are informative reference points that may be useful to implementers for testing components (these test points will not typically be testable in an implemented system).

Figure 53-2—Block diagram for LX4 PMD transmit/receive paths

NOTE—Specification of the retimer function is beyond the scope of this standard; however, a retimer may be required to ensure compliance at test points TP2 and TP3.

802.3ba PMD test points
10GBASE-S/L/E relationship to OSI reference model

Figure 52–1—10GBASE-S, -L, and -E PMDs relationship to the ISO/IEC Open Systems Interconnection (OSI) reference model and the IEEE 802.3 CSMA/CD LAN model
### 10GBASE-R and 10GBASE-W PMD block diagram

![Diagram showing a block diagram with PMD test points for 10GBASE-R and 10GBASE-W.]

#### Table 52–1—10GBASE serial PHYs

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>10GBASE-SR</td>
<td>850 nm Serial LAN PHY</td>
</tr>
<tr>
<td>10GBASE-LR</td>
<td>1310 nm Serial LAN PHY</td>
</tr>
<tr>
<td>10GBASE-ER</td>
<td>1550 nm Serial LAN PHY</td>
</tr>
<tr>
<td>10GBASE-SW</td>
<td>850 nm Serial WAN PHY</td>
</tr>
<tr>
<td>10GBASE-LW</td>
<td>1310 nm Serial WAN PHY</td>
</tr>
<tr>
<td>10GBASE-EW</td>
<td>1550 nm Serial WAN PHY</td>
</tr>
</tbody>
</table>

#### Figure 52–2—Block diagram

**802.3ba PMD test points**
802.3ba Cu link diagrams

specify PCB loss between transmit block and connector and receive block and connector without addition of explicit test points

802.3ba PMD test points
The above block diagram shows relevant elements and interfaces for a link between two PMAs. The patch cord is included for the definition of TP2. Otherwise, intermediate fiber connectors are not shown.

TP1, TP2, TP3, and TP4 are traditional labels in 802.3 for interfaces of a fiber optics link. Here the PMA may be a host ASIC and the PMD may be a fiber optics module.
Fig 47-1 - XAUI and XGXS relationship to the ISO/IEC Open Systems Interconnection (OSI) reference model and the IEEE 802.3 CSMA/CD LAN model

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