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For more information about ODI, go to http://axiestandard.org/odispecifications.html

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ODI-D Documentation Templates

Revision History

This section is an overview of the revision history of the ODI-1 specification.

<table>
<thead>
<tr>
<th>Revision Number</th>
<th>Date of Revision</th>
<th>Revision Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>January 29, 2019</td>
<td>Initial Version.</td>
</tr>
</tbody>
</table>

Table 1-1: Architectural Specification Revisions
1. ODI Specification Organization and Requirements

1.1 Introduction

ODI is the abbreviation for Optical Data Interface, a high-speed interface for advanced instrumentation and embedded systems. ODI breaks speed and distance barriers by relying on optical communication between devices, over a simple pluggable optical cable.

ODI-1, ODI-2, and ODI-2.1 describe the physical, transport, and data format layers of the ODI specifications respectively. ODI-A describes a common API for test and measurement equipment.

This specification, ODI-D, describes a recommended set of documentation templates that together describe the ODI capabilities of any one device. By doing so, ODI device capabilities may be compared ahead of time to ensure interoperability.

Figure 1-1: ODI Specification Structure
1.2 ODI-D Compliance
ODI-D defines a set of templates that document the ODI capabilities of a device. ODI-D is a recommendation only, and there are no compliance requirements. However, each of the ODI-numbered specifications (ODI-1, ODI-2, ODI-2.1) contains its own documentation requirements for compliance, and ODI-D is a method to meet those requirements.

1.3 Audience of Specification
This specification is primarily for the use by
- Design engineers designing ODI products
- Product marketing engineers creating data sheets for ODI products
- System integrators selecting ODI products

1.4 References
Several other documents and specifications are related to the ODI specifications. These include:
- Telecommunications Industry Association (TIA) standards:
  TIA-604-5-D, FOCIS 5 Fiber Optic Connector Intermateability Standard- Type MPO,
  TIA-568.3-D, Optical Fiber Cabling Component Standard.
  [http://www.tiaonline.org](http://www.tiaonline.org)
- Institute of Electrical and Electronics Engineers (IEEE)
  802.3-2016, IEEE Standard for Ethernet
  [http://standards.ieee.org](http://standards.ieee.org)
- VITA standards:
2. Overview of the ODI Documentation Templates

ODI-D consists of three templates, that describe the following:

- **ODI Physical Interface Characteristics.** This template largely describes the physical characteristics of an ODI device and meets the documentation requirements of ODI-1. Characteristics described include the number of ports, the lane rates, port directionality, port aggregation, Interlaken characteristics, flow control, and the maximum streaming data rate in units of equivalent GByte/s/port.

- **ODI Packet Capability.** This template describes the ODI packet types supported, the characteristics of each, the timestamp capabilities, the support of Trailer bits, Data Packet size constraints, and any use of Pad Word Count or Pad Bit Count. Along with the Data Format and Class ID Table, the template meets the documentation requirements of ODI-2 and ODI-2.1.

- **ODI Data Format and Class ID Table.** This table documents the data formats used, the number of channels, real or complex, the packing method, and the Class IDs that match with each combination. This is made to document the data formats used in ODI-2.1.
### 2.1 ODI Physical Interface Characteristics
This table describes the physical layer interface for a device with 1 or N ODI ports.

**ODI Physical Interface characteristics (ODI-1)**

<table>
<thead>
<tr>
<th>Specification</th>
<th>ODI-1: Physical Layer Specification, Revision 3.0</th>
<th>Add exceptions and notes in this column</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of ODI Ports</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Connector</td>
<td>MPO style, 2 rows of 12 fiber positions, or describe connector and adapter scheme</td>
<td></td>
</tr>
<tr>
<td>Lane Rates</td>
<td>12.5 Gbit/s, 14.1 Gbit/s</td>
<td></td>
</tr>
<tr>
<td>Burst Max</td>
<td>256 byte, 2048 byte</td>
<td></td>
</tr>
<tr>
<td>Flow Control</td>
<td>None, In Band, Backplane, SMB front panel connector, MMCS front panel connector</td>
<td></td>
</tr>
<tr>
<td>Port Directionality</td>
<td>Bi-directional, Producer only, Consumer only, Dual uni-directional</td>
<td></td>
</tr>
<tr>
<td>Port Aggregation</td>
<td>Not applicable, or N ports (describe how ports are aggregated)</td>
<td></td>
</tr>
<tr>
<td>Interlaken Channels</td>
<td>1 channel (Ch 0), or describe use of channels</td>
<td></td>
</tr>
<tr>
<td>Streaming Data Rate</td>
<td>Equivalent GByte/s/port. Describe producer capability, consumer limitations, buffering size, effect of measurement channels and operating modes, etc.</td>
<td></td>
</tr>
</tbody>
</table>

*Note 1: Equivalent GByte/s/port is described in ODI-1 Section 5. Documentation Requirements.*
2.2 ODI Packet Capability
This table describes the ODI Packet types supported, and the capabilities of several fields within the packet types.

**ODI Packet capability (ODI-2, ODI-2.1)**

<table>
<thead>
<tr>
<th>Specification</th>
<th>ODI-2: Transport Layer, Revision 3.0, ODI-2.1: High Speed Data Formats, Revision 3.0</th>
<th>Add exceptions and notes in this column</th>
</tr>
</thead>
<tbody>
<tr>
<td>Packet Types supported</td>
<td>VITA-49/ODI-2.1 Time Data, VITA-49/ODI-2.1 Signal Context, VITA-49/ODI-2.1 Control, Other VITA-49/ODI-2 packet types (<em>describe</em>), Other (<em>describe</em>).</td>
<td></td>
</tr>
<tr>
<td>Context packets</td>
<td>Not used. <em>Or</em>, ODI-2.1 Signal Context packets using fields &lt;list&gt;, Other (<em>describe</em>).</td>
<td></td>
</tr>
<tr>
<td>Control packets</td>
<td>Not used. <em>Or</em>, ODI-2.1 Control packets using fields &lt;list&gt;, Other (<em>describe</em>).</td>
<td></td>
</tr>
<tr>
<td>Timestamp support</td>
<td>None, GPS, Relative Time, Sample Count. <em>describe use and accuracy</em></td>
<td></td>
</tr>
<tr>
<td>Trailer bit support</td>
<td><em>Describe use of trailer bits, if any.</em></td>
<td></td>
</tr>
<tr>
<td>Data Format Class IDs supported</td>
<td>See table below</td>
<td></td>
</tr>
<tr>
<td>Signal Data Packet Size</td>
<td><em>Document packet size capability and limitations, use of Pad Word Count and/or Pad Bit Count</em></td>
<td></td>
</tr>
</tbody>
</table>
2.3 ODI Data Format and Class ID Table
This table documents the data formats used, the number of channels, real or complex, the packing method, and the Class IDs that match with each combination.

Data Format and Class ID Table (ODI-2.1)

<table>
<thead>
<tr>
<th>Item Packing Field Width</th>
<th>Data Item (signed)</th>
<th>Event bits</th>
<th>Real or Complex</th>
<th>Channels</th>
<th>Class ID</th>
<th>API constant</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>8-bit fixed pt.</td>
<td>0</td>
<td>Real</td>
<td>1</td>
<td>0x00245CCB00020000</td>
<td>Re8Bit1Ch</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>10-bit fixed pt.</td>
<td>0</td>
<td>Real</td>
<td>1</td>
<td>0x00245CCB00004000</td>
<td>Re10BitPacked1Ch</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>12-bit fixed pt.</td>
<td>0</td>
<td>Real</td>
<td>1</td>
<td>0x00245CCB00008000</td>
<td>Re12BitPacked1Ch</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>16-bit fixed pt.</td>
<td>0</td>
<td>Real</td>
<td>1</td>
<td>0x00245CCB00030000</td>
<td>Re16Bit1Ch</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Complex</td>
<td>1</td>
<td>0x00245CCB00130000</td>
<td>Iq16Bit1Ch</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>12-bit fixed pt.</td>
<td>4</td>
<td>Real</td>
<td>1 to 4</td>
<td>0x00245CCB00C30000 to 0x00245CCB00C30003</td>
<td>Re12Bit4Event1Ch to Re12Bit4Event4Ch</td>
<td></td>
</tr>
</tbody>
</table>

Note 1: Class ID values in the above table are for Pad Bit Count and Pad Word Count of zero.
Note 2: If additional non-ODI Packet Types or data formats are supported, document here. See template in VITA 49.2 Appendix A.2.
Note 3: Bold rows are mandatory in ODI-2.1 for the Real/Complex formats supported.