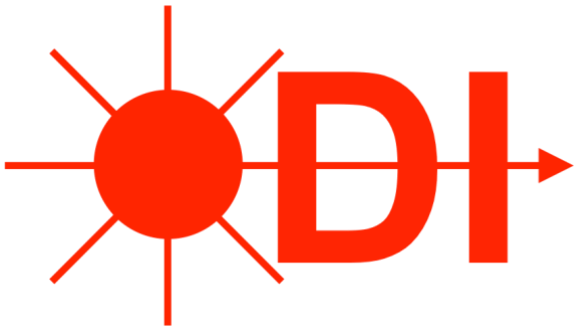

ODI-D: Documentation Templates

Optical Data Interface

Revision 1.0

January 29, 2019

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For more information about ODI, go to
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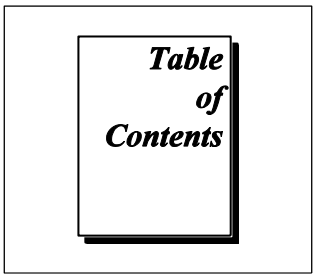

Important Information 2

Warranty 2

Trademarks 2

List of Figures 3

ODI-D Documentation Templates 4

1. ODI Specification Organization and Requirements 5
1.1 Introduction 5
1.2 ODI-D Compliance 6
1.3 Audience of Specification 6
1.4 References 6

2. Overview of the ODI Documentation Templates 7
2.1 ODI Physical Interface Characteristics 8
2.2 ODI Packet Capability 9
2.3 ODI Data Format and Class ID Table 10

List of Figures

Figure 1-1: ODI Specification Structure 5

Table 1-1: Architectural Specification Revisions 4

ODI-D Documentation Templates

Revision History

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

Revision Number	Date of Revision	Revision Notes
1.0	January 29, 2019	Initial Version.

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.

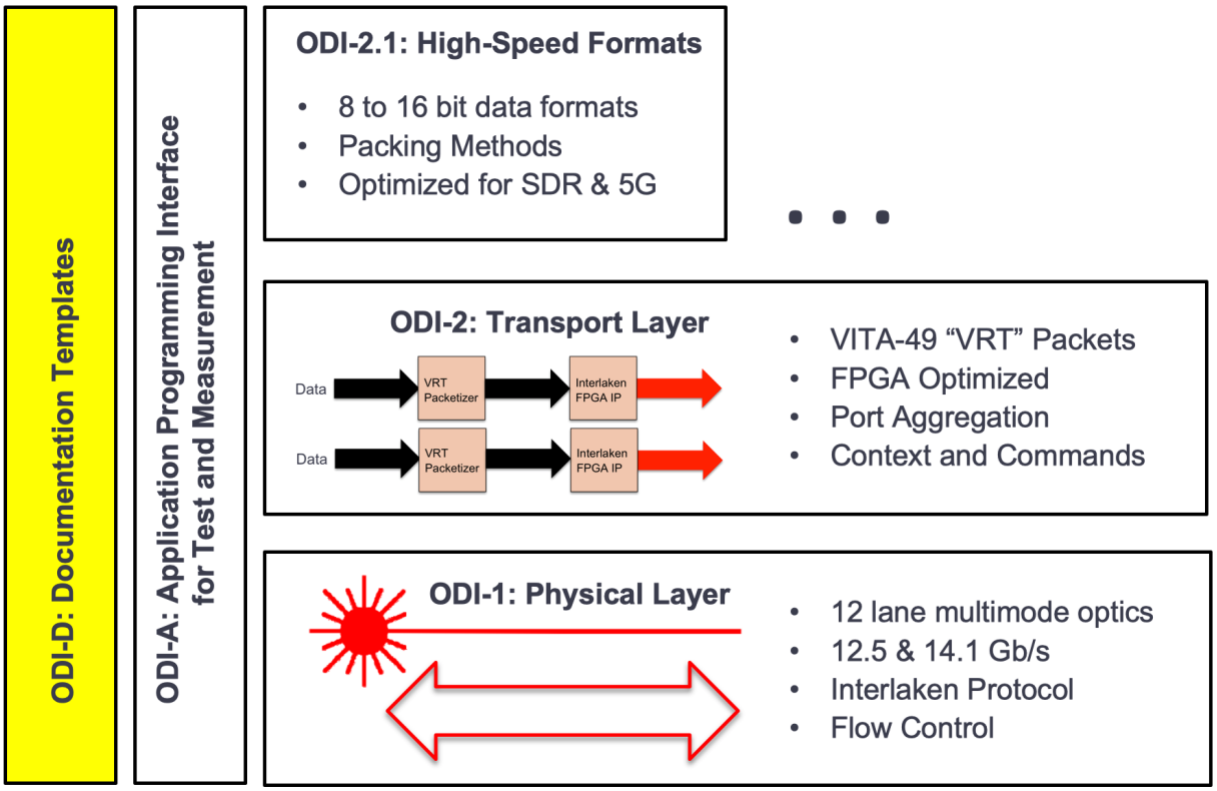

Figure 1-1: ODI Specification Structure

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
- Institute of Electrical and Electronics Engineers (IEEE)
  802.3-2016, *IEEE Standard for Ethernet*

  http://standards.ieee.org
- Interlaken Protocol Specification, v1.2. http://www.interlakenalliance.com
- VITA standards:
  VITA 49.2 *VITA Radio Transport (VRT) Standard for Electromagnetic Spectrum*, VITA 49A *Spectrum Survey Interoperability Specification*

  https://shop.vita.com/ANSI-VITA-Standards_c4.htm

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)

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

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)

Specification	ODI-2: Transport Layer, Revision 3.0, ODI-2.1: High Speed Data Formats, Revision 3.0	*Add exceptions and notes in this column*
Packet Types supported	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 *(describe),* Other *(describe)*.	
Context packets	Not used. *Or,* ODI-2.1 Signal Context packets using fields *<list>*, Other *(describe)*.	
Control packets	Not used. *Or,* ODI-2.1 Control packets using fields *<list>*, Other *(describe)*.	
Timestamp support	None, GPS, Relative Time, Sample Count. *describe use and accuracy*	
Trailer bit support	*Describe use of trailer bits, if any.*	
Data Format Class IDs supported	See table below	
Signal Data Packet Size	*Document packet size capability and limitations, use of Pad Word Count and/or Pad Bit Count*	

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)

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

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.