Micro Integrable Tunable Laser Assembly Implementation Agreement

OIF-MicroITLA-01.1

July 13th, 2015

Implementation Agreement created and approved
by the Optical Internetworking Forum
www.oiforum.com

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4 Document Revision History

Version	Date	Description
1,0	September 20, 2011	Official Release
1,1	May 5, 2014	Correction of connector gender in section 7.1.1 References to OIF-ITLA-MSA-1.2 revised to OIF-ITLA-MSA-1.3. This reflects the high resolution frequency register option
1,1	May 30th 2014	Added reference to connector manufacturer in section 7.1.1 as proposed in oif2014.188
1.1	July 13th 2015	Added list of members at Principal Ballot date

Working Group: **Physical Link Layer**

TITLE: **Micro - ITLA Implementation Agreement (OIF-MicroITLA)**

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DATE: **13th July 2015**

Project Name: **Micro - Integrable Tunable Laser Assembly IA (OIF-MicroITLA)**
Project Number: OIF-0063
Project Abstract: The objective of this project is to define an implementation agreement for a small form factor ITLA. It needs to be read in conjunction with the OIF-ITLA-MSA 1.2 and defines changes to the electrical and mechanical definition.

Document Maintenance:
As a result of document maintenance users will need to refer to ITLA-MSA 1.3 to obtain information on high resolution registers.

5 References and Conventions

5.1 External Reference Documents

The following documents should be read in conjunction with this specification

OIF-ITLA-MSA-1.3		OIF Tunable Laser MSA Implementation Agreement (www.oiforum.com)
300 Pin MSA		1) Reference Document for 300 PIN 10Gb Transponder 2) Reference Document for 300 PIN 40Gb Transponder 3) I^{2}C Reference Document for 300 Pin MSA 10G and 40G Transponder
GR-468-CORE		General Reliability Assurance Requirements for Optoelectronic Devices Used in Telecommunications Equipment
GR-1217-CORE		Generic Requirements for Separable Electrical Connectors Used in Telecommunications Hardware
CENELEC	EN50081-1	Electromagnetic Compatibility – Generic Emissions Standard part 1: Residential, Commercial and Light Industry
	EN50082-1	Electromagnetic Compatibility – Generic Immunity Standard part 1: Residential, Commercial and Light Industry
	EN50081-1	Electromagnetic Compatibility – Generic Emissions Standard part 2: Residential, Commercial and Light Industry
EIA RS-232D		The RS232 Bus Specification
21CFR1040.10		Laser Safety
IEC 60825-1		Safety Of Laser Products Part1: Equipment Classification, Requirements and Users Guide
G.694.1		Spectral grids for WDM applications: DWDM frequency grid

5.2 Conventions Used in This Document

OIF-ITLA-MSA 1.2	OIF Tunable Laser MSA Implementation Agreement version 1.2
OIF-ITLA-MSA 1.3	OIF Tunable Laser MSA Implementation Agreement version 1.3
ITLA	Integrable Tunable Laser Assembly, as defined in OIF-ITLA-MSA 1.3
Micro-ITLA	Small form-factor ITLA, as defined in this implementation agreement
Module	Refers to the Micro-ITLA as a module.

6 Introduction

This section introduces the Micro-ITLA. The reader should refer back to OIF-ITLA-MSA 1.3 for an overview of the communication and commands (section 6.3 – 6.5).

6.1 Scope

This document describes an additional mechanical form-factor to the Multi-Source Agreement OIF-ITLA-MSA 1.3.
Referring back to OIF-ITLA-MSA 1.3 document, this Implementation Agreement only details the electrical and mechanical characteristics for which the Micro-ITLA implementation agreement replaces OIF-ITLA-MSA 1.3.

6.2 Background

The OIF has completed three tunable laser projects.

The first project resulted in the *Tunable Laser Implementation Agreement*, OIF-TL-01.1 began in April 2001 and was released in November 2002. A large number of contributors from a wide variety of consumers and suppliers of tunable lasers were involved in contributing and reviewing the first Implementation Agreement. It addressed the communication protocol, electrical interface and mechanical form factor interoperability for tunable continuous wavelength (CW) lasers. The document serves as a roadmap for future tunable device implementation agreements.

In February 2003, the OIF began a new fast track project, the *Tunable Laser MSA Implementation Agreement*. This MSA-IA builds upon the existing *Tunable Laser Implementation Agreement*, generating a more comprehensive specification of the optical, electrical, mechanical, and communication protocols. It was completed in May 2003.

In October 2003, the OIF began a new project #0013, the *Integrable Tunable Laser Assembly (ITLA) MSA Implementation Agreement* to focus on standardization of a CW laser subassembly for integration into both the 3.5" x 4.5" transponder as well as the small form factor transponder. This Implementation Agreement (OIF-ITLA-MSA1.1) was completed in November 2005. In June 2008 a maintenance update (OIF-ITLA-MSA 1.2) was released.

In July 2010, the OIF initiated project #0063, the *Micro Integrable Tunable Laser Assembly (Micro-ITLA) Implementation Agreement* to define an alternate smaller form-factor for a module with the performance of an ITLA. The objective was to realize at least a factor two reduction in area and a reduction in height. In addition the power consumption and max case temperature was to be revisited.

The OIF Implementation Agreements can be found at www.oiforum.com The link to these documents is http://www.oiforum.com/documents/implementation-agreements/

7 Physical Layer & Electrical Characteristics

This section describes the electrical interface and the physical layer interface. The reader should refer back to OIF-ITLA-MSA 1.3 for all specifications that are not specifically included in this document.

7.1 Assembly Electrical Interface

7.1.1 Electrical Connector on User's Board

User's connector on transponder board: Advanced Interconnections Corp. DHS-2-14-844-G-G-M or equivalent.
Note: Connection from Micro-ITLA module made through appropriate male mating connector. e.g. Advanced Interconnections Corp. DHAM-2-14-846-GH-M and SK11015 are examples of a suitable GR-1217-CORE compliant connector.

7.1.2 Pin Assignments

The pin assignments are shown in Table 7.1-1. In addition to the pin assignments in OIF-ITLA-MSA1.3, pin 13 has been assigned to a +1.8V voltage supply. The use of pin 13 and pin 14 is optional and vendor specified.

Table 7.1-1 Pin Assignments

PIN Name	PIN #		PIN #	PIN Name
+3.3V Supply	1		2	DIS*
+3.3V Supply	3		4	SRQ*
Gnd	5		6	MS*
Gnd	7		8	TxD
-5.2 Supply	9		10	RxD
-5.2 Supply	11		12	RST*
+1.8V Supply[1]	13		14	DitherAA[2][3]

In addition to the pin functions described in OIF-ITLA-MSA 1.3, Table 7.1-2 describes the function for the additional pin 13.

Table 7.1-2 Function of additional pin

Pin Numbers	Symbol	Type	Name	Description
13	PS+1.8V	Power	+1.8V Supply	+1.8V Power Supply **Note**: Usage of pin is optional, as defined by the supplier.

[1] Optional pin use
[2] Optional pin use
[3] Amplitude dither for trace tone functionality (TxTrace).

7.1.3 Electrical Characteristics

In addition to the electrical characteristics in OIF-ITLA-MSA 1.3, Table 7.1-3 provides additional electrical characteristics for the Micro-ITLA.

Table 7.1-3: Additional Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit
+1.8V Supply voltage		1.71	1.80	1.89	V
+1.8V Supply current				1000	mA
Absolute Maximum Rating +1.8V Supply Voltage		-0.3		2.0	V

Table 7.1-4 lists the electrical characteristics from OIF-ITLA-MSA 1.3 that are replaced by this implementation agreement.

Table 7.1-4: Replaced Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit
Power Dissipation[4]	P_D			5.0	W
Absolute Maximum Rating Operating 'base of butterfly' temperature range[5]	T_{BTF}	-5		+75	°C
Absolute Maximum Rating Total power dissipation				5	W

[4] The supply configuration allows an ITLA to either draw all its power from a single supply or from both supplies as long as the total average power dissipation does not exceed P_D.
[5] Requires adequate heat sinking

8 Transport Layer

The reader should refer back to OIF-ITLA-MSA 1.3 for the definition of the transport layer (section 8).

9 Command Interface (Application Layer)

The reader should refer back to OIF-ITLA-MSA 1.3 for the definition of the command interface (section 9).

10 Alarm and Status Register Behavior

The reader should refer back to OIF-ITLA-MSA 1.3 for the definition of the alarm and status register behavior (section 10).

11 Optical Specifications

The reader should refer back to OIF-ITLA-MSA 1.3 for the optical specifications (section 11).

12 The Mechanical Specifications

This section replaces the mechanical specifications (section 12) in OIF-ITLA-MSA 1.3.

12.1 Micro-ITLA Mechanical Outline Dimensions

Figure 12.1-1 and Table 12.1-1 detail the mechanical outline of the Micro-ITLA. See §7.1.1 for details on the electrical connection.
The minimum fiber bend radius is 15 mm.
The mounting holes are without thread, suitable for M1.6 screws.

Note: the sum of the MAX dimension for L (length of module) and LF (length of fiber boot) exceeds the MAX dimension for LT (total length). The module vendor has the option to trade-off between L and LF, with the condition that MAX dimensions for LT, LF and L are not exceeded.

Figure 12.1-1 *Mechanical Outline Dimensions*

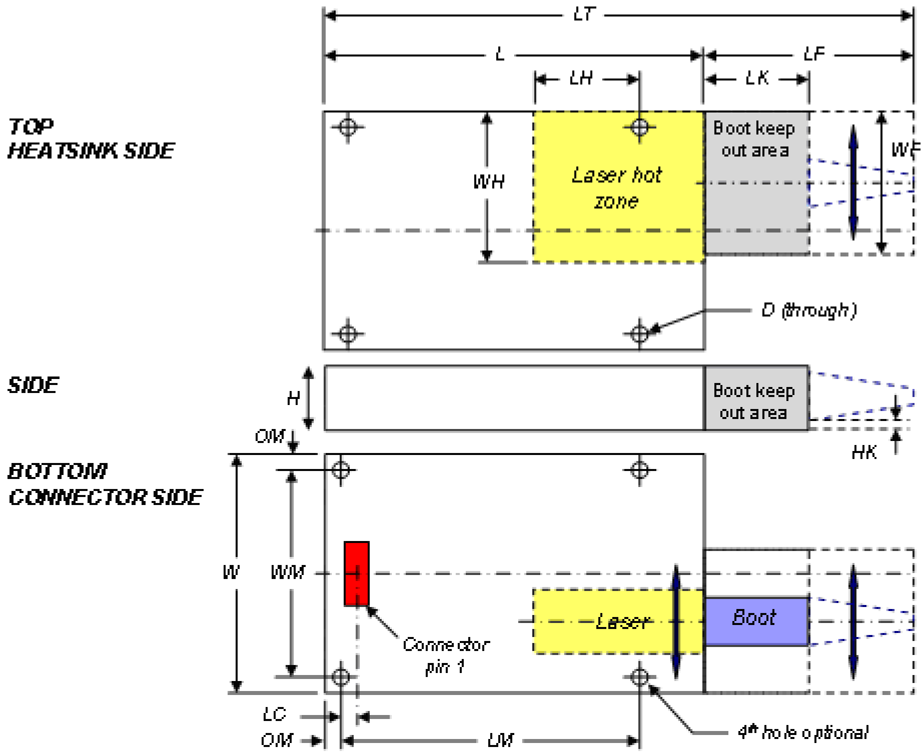

Table 12.1-1: Mechanical Outline Dimensions

Parameter	Symbol	Value
Width of module	W	20 mm
Length of module	L	MIN 34 mm MAX 45 mm
Total length	LT	MAX 65 mm
Height of module	H	MAX 7.5 mm
Pitch of mounting hole – length direction	LM	30 mm
Pitch of mounting hole – width direction	WM	16 mm
Offset of mounting hole from edge of module	OM	2 mm
Diameter mounting hole	D	2 mm
Offset centerline connector to mounting hole	LC	2 mm
Width fiber boot area	WF	14 mm
Length fiber boot area	LF	MAX 25 mm
Length fiber boot keep out zone	LK	10 mm
Clearance below boot	HK	1 mm
Length between start of laser hot zone and mounting hole	LH	12 mm
Width of laser hot zone	WH	14 mm

13 Appendix A: Open Issues / Current Work Items

None

14 Appendix B: List of Companies and Contributors

14.1 Technical Contributors

Ciena	Ian Betty
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14.2 List of OIF Member Companies (at time of adoption)

Acacia Communications
ADVA Optical Networking
Alcatel-Lucent
Altera
AMCC
Amphenol Corp.
Analog Devices
Anritsu
Avago Technologies Inc.
Broadcom
Brocade
BRPhotonics
BTI Systems
China Telecom
Ciena Corporation
Cisco Systems
ClariPhy Communications
Coriant R&G GmbH
CPqD
EMC Corporation
Emcore
Ericsson
ETRI
FCI USA LLC
Fiberhome Technologies Group
Finisar Corporation
Fujikura
Fujitsu
Furukawa Electric Japan
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Hitachi
Huawei Technologies Co., Ltd.
IBM Corporation
Infinera
Inphi
Intel
Ixia
JDSU
Juniper Networks
Kaiam
Kandou
KDDI R&D Laboratories
Keysight Technologies, Inc.
Luxtera
M/A-COM Technology Solutions
Marvell Technology
Mellanox Technologies
Microsemi Inc.
Microsoft Corporation
Mitsubishi Electric Corporation
Molex
MoSys, Inc.
NEC
NeoPhotonics
NTT Corporation
O-Net Communications (HK) Limited
Oclaro
Orange
PETRA
Picometrix
PMC Sierra
QLogic Corporation
Qorvo
Ranovus
Rockley Photonics
Samtec Inc.
Semtech
Socionext Inc.
Spirent Communications
Sumitomo Electric Industries
Sumitomo Osaka Cement
TE Connectivity
Tektronix
TELUS Communications, Inc.
TeraXion
Texas Instruments
Time Warner Cable
US Conec
Verizon
Xilinx
Yamaichi Electronics Ltd.
ZTE Corporation

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