

PRODUCT DATA SHEET

DSL

Optical DVI Extension System



Revision History

Version Number	Revision Date	Page	Description of Changes
1.0	May.19.2008	ALL	Initial Version
1.1	Jun.30,2008	7	Optical SPEC Added
1.2	Jun.01,2009	6, 7	Supply current and Optical SPEC Changed
1.3	Apr.03,2012	7	Optical Specification modified
1.4	Apr .09,2012	9	Ordering Information Removed
1.5	Nov.11.2019	ALL	Renewal Specification

PROPRIETARY NOTE

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1. General Description

DSL, optical DVI extension module, is designed to let digital flat panel display signal extend over 1,000 meters away from host based on DVI standard by optical transmission technology. Its small package and pseudo DDC detect function and Self-EDID detect function to use standard SC fiber connector allow users to install and utilize the device conveniently.

- Long distance transmission of digital graphic signal corresponding to T.M.D.S
-over 1000 meter(3,300ft) by multi-mode one fiber.
- R, G, B, Clock signals are transmitted separately by one multi-mode optical fiber.
- Pseudo-DDC detection function for EDID information.
Self detecting function for EDID information.
Maximum supported resolution is WUXGA
- External power supply for Transmitter is optional. Automatic power switch is included.

2. General Specification

Parameter	Symbol	
	Transmitter	Receiver
Optical Converter	850nm, 4ch Transmit OSA	850nm, 4ch Receive OSA
Input and Output Signal	TMD5 Signal(DVI 1.0 standard)	TMD5 Signal(DVI 1.0 standard)
Max Data Transfer rate	1.65Gbps / Channel	
Module Size	40.0 x 15.0 x 66.4 mm (W x H x D)	
Module Weight	--	--
Electrical Connector	24 PIN DVI-D Plug(input)	24 PIN DVI-D Plug(output)
Optical Connector	1 SC Connector	1 SC Connector
Recommended Fiber	50/125 μ m Multi-mode glass-fiber	

3. Absolute Maximum Ratings

Parameter	Rating
Storage temperature	-20°C ~ +70°C Non-Condensing
Operating temperature	0°C ~ +50°C Non-Condensing
Transportation temperature	-20°C ~ +70°C Non-Condensing
Power Supply	-0.3 ~ 5.5 V
Relative Humidity	10 ~ 80 %

NOTICE

Stresses greater than those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operations section for extended periods of time may affect reliability.

4. Electrical Specification

4.1 Electrical Specification

4.1.1 Transmitter Module

	Parameter	Symbol	Min	Typ	Max	Units	Condition
P O W E R	Supply Voltage (Option External Power)	Vcc	+4.5	+5.0	+5.5	V	
	Supply Current	Icc		160		mA	
	Power Dissipation	Po		0.8		W	
T M D S	Reference voltage for graphic signal	Vref	+3.1	+3.3	+3.5	V	
	Single-ended high level input voltage	VH	Vref-0.01		Vref+0.01	V	
	Single-ended low level input voltage	VL	Vref-0.6		Vref-0.4	V	
	Single-ended input swing voltage	Vswing	0.4		0.6	V	
	Single-ended standby input voltage		Vref-0.01		Vref+0.01	V	
	Data Output Load	RLD		50		Ohms	

4.1.2 Receiver Module

	Parameter	Symbol	Min	Typ	Max	Units	Condition
P O W E R	Supply Voltage (External Power)	Vcc	+4.5	+5.0	+5.5	V	
	Supply Current	Icc		125		mA	
	Power Dissipation	Po		0.63		W	
T M D S	Reference voltage for graphic signal	Vref	+3.1	+3.3	+3.5	V	
	Single-ended output swing voltage	Voswing	0.4		0.6	V	AC couple
	Data Input Load	RLD		50		Ohms	

4.2 Optical Specification

4.2.1 Transmitter Characteristics

Parameter (per Channel)	Symbol	Min	Typ	Max	Units
Optical Power ¹	Pout	-3.0	0.0		dBm
Optical Modulation Amplitude		-6.25			dBm
Center Wavelength – Lane 0			778		nm
Center Wavelength – Lane 2			800		nm
Center Wavelength – Lane 2			825		nm
Center Wavelength – Lane 3			850		nm
Optical Rise/Fall Time ²			200		Ps

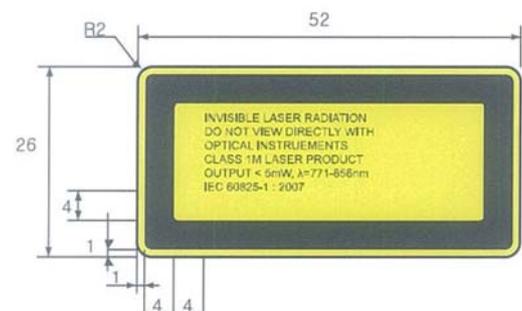
4.2.2 Receiver Characteristics

Parameter (per channel)	Symbol	Min	Typ	Max	Units
Wavelength – Lane 0			778		nm
Wavelength – Lane 1			800		nm
Wavelength – Lane 2			825		nm
Wavelength – Lane 3			850		nm
Data Rate per Channel ³				1.65	Gb/s
Peak Optical Input Power	Pin		0.0	4.0	dBm
OMA Sensitivity ⁴		-14.25	-16.00		dBm

Transmitter module of Model DSL 4 channel includes VCSEL(Vertical Surface Emitting Laser Diode) with 850 nm invisible laser radiation.

Do not view directly laser module of transmitter or the end of the other side of optical cable connected to transmitter with optical instrument.

Transmitter module of DSL is Class 1M Laser Product.



¹ I= 5mA, T=25C. Measured at the end of a 2m section of 62.5μ fiber.

² Rise and fall times measured from 20 - 80%

³ Requires DC-balanced data pattern and max run rate of 80 bits. Measured with input signals conforming to HDMI rev 1.3a.

⁴ Optical Modulation Amplitude. Based on an unstressed input signal.

4.3 Connector Pin Assignment

4.3.1 Transmitter

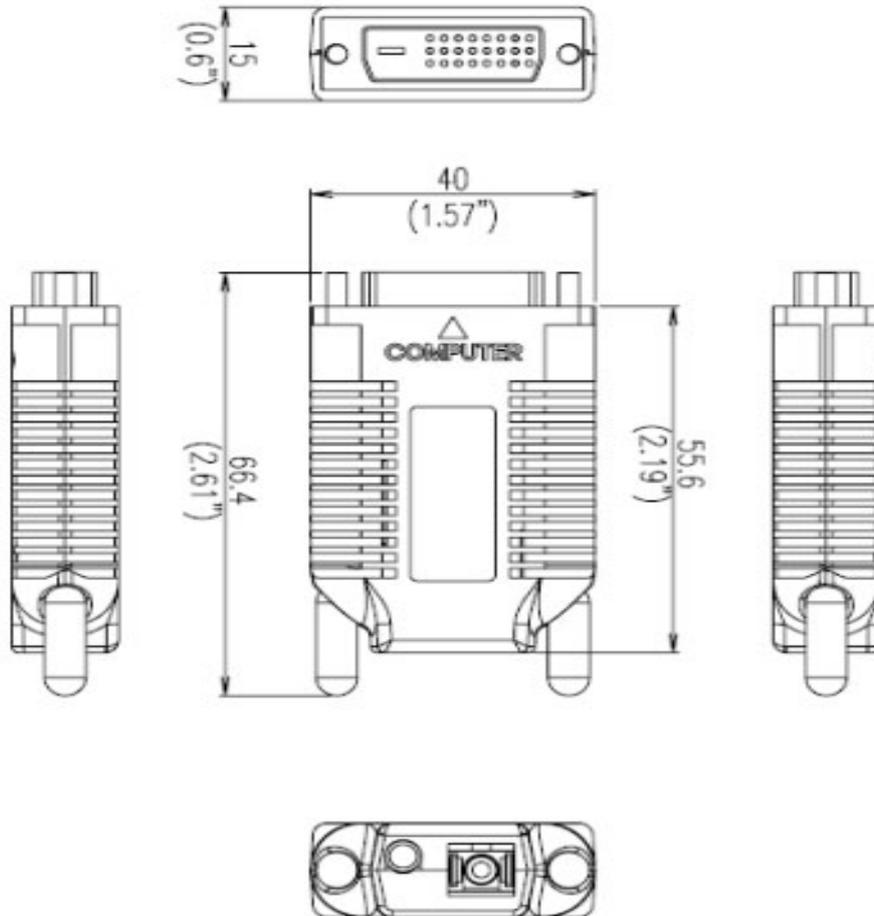
Pin	Signal Assignment	Pin	Signal Assignment	Pin	Signal Assignment
1	T.M.D.S. Data2-	9	T.M.D.S. Data1-	17	T.M.D.S. Data0-
2	T.M.D.S. Data2+	10	T.M.D.S. Data1+	18	T.M.D.S. Data0+
3	T.M.D.S. Data2 Shield	11	T.M.D.S. Data1 Shield	19	T.M.D.S. Data0 Shield
4	No Connect	12	No Connect	20	No Connect
5	No Connect	13	No Connect	21	No Connect
6	DDC Clock (Only TX)	14	+5V Power	22	T.M.D.S Clock Shield
7	DDC Data (Only TX)	15	Ground (for +5V)	23	T.M.D.S Clock+
8	No Connect	16	Hot plug detect	24	T.M.D.S Clock-

4.3.2 Receiver

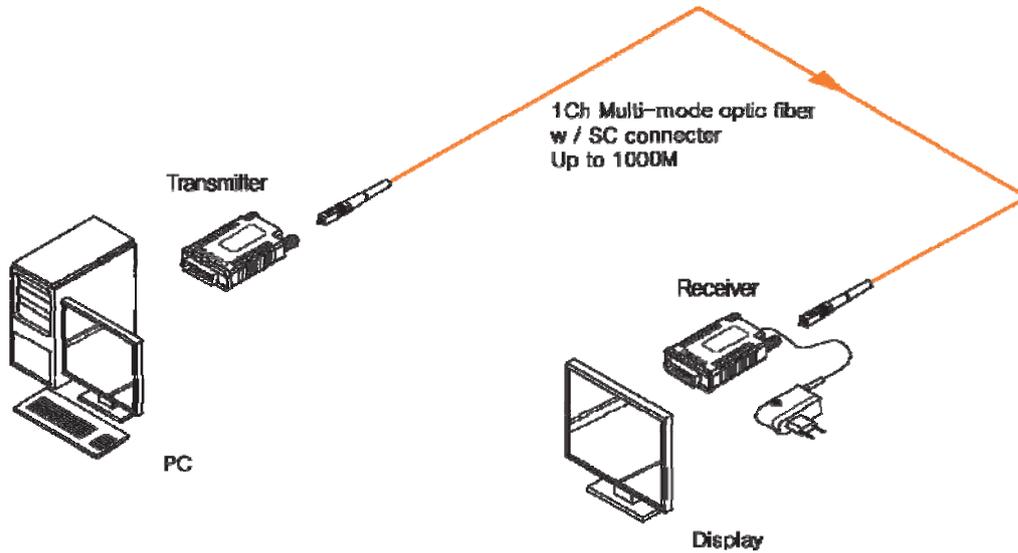
Pin	Signal Assignment	Pin	Signal Assignment	Pin	Signal Assignment
1	T.M.D.S. Data2-	9	T.M.D.S. Data1-	17	T.M.D.S. Data0-
2	T.M.D.S. Data2+	10	T.M.D.S. Data1+	18	T.M.D.S. Data0+
3	T.M.D.S. Data2 Shield	11	T.M.D.S. Data1 Shield	19	T.M.D.S. Data0 Shield
4	No Connect	12	No Connect	20	No Connect
5	No Connect	13	No Connect	21	No Connect
6	No Connect	14	Out +5V Power	22	T.M.D.S Clock Shield
7	No Connect	15	Ground (for Out +5V)	23	T.M.D.S Clock+
8	No Connect	16	No Connect	24	T.M.D.S Clock-

5. Mechanical Specification

5.1 Transmitter and Receiver Case Dimension

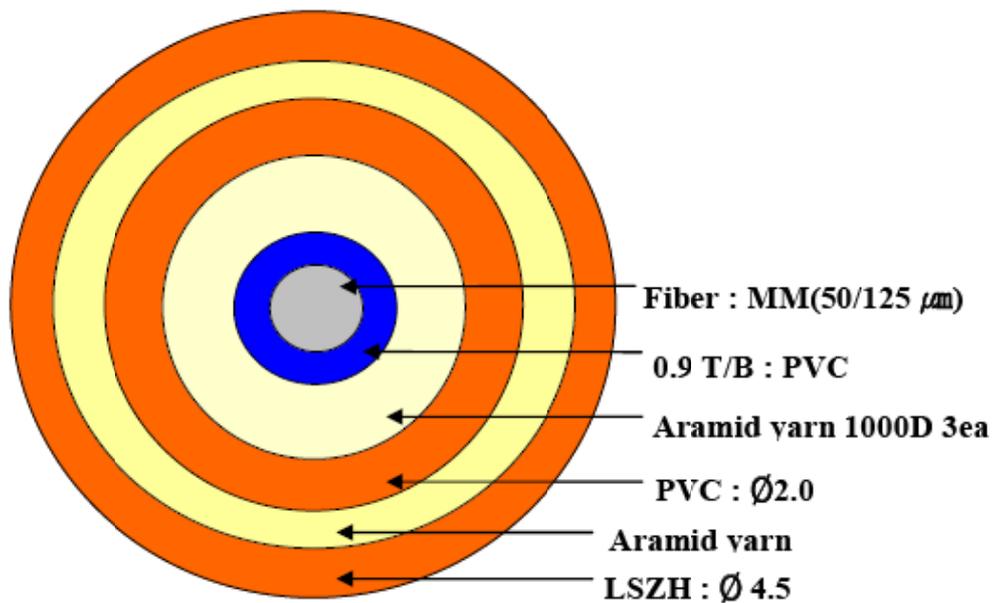


5.2 Connection



5.3 Optical Cable

- Optical Fiber Cable (MMF 50/125)



6. Regulatory

6.1 EMC & Safety Agency approval

6.1.1 CE-EMC compliance:

This Product is investigated to EN55022:2015, EN55024:2010, EN61000-3-2:2014 and EN61000-3-3:2013

6.1.2 FCC compliance:

This Product is investigated to FCC 47CFR part 2 and part 15

6.1.3 Safety

UL 60601-1 (Medical Electrical Equipment - Safety - Part 1: General Requirements)

CAN/CSA C22.2 No. 601.1-M90 (Medical Electrical Equipment - Safety – Part 1: General Requirements)

6.1.4 Eye Safety

CLASS 1M LASER PRODUCT-IEC60825-1:2007(2nd Edition)

7. Packing Information

Set(Unpacking, DSL Only)	40.0mm*66.4mm*15.0mm	40.0g
Package(1Set, Inner Box Packing)	160.0mm*140.0mm*67.0mm	220.0g
Package(Multi, 32PCS Packing)	595.0mm*305.0mm*345.0mm	9.0Kg

8. RoHS

OPHIT is fully aware of the requirement under the **Restriction of Hazardous Substances in Electrical and Electronic Equipment Directive EU 2015/863(RoHS3)**, which adds four new restricted substances to the previous Directive 2011/65/EU(RoHS2).

Hereby we guarantee that we do not intentionally use the substances described below and based on third party chemical analysis the thresholds of the substances as indicated are not exceeded for our all products.

Substance	CAS #	RoHS Limity by % (PPM)
Lead (PB)	7439-92-1	0.1% (1000 PPM)
Mercury (Hg)	7439-97-6	0.1% (1000 PPM)
Hexavalent Chromium (CrVI)	15840-29-9	0.1% (1000 PPM)
Polybrominated Biphenyls (PBB)	-	0.1% (1000 PPM)
Polybrominated Diphenyl Ethers (PBDE)	-	0.1% (1000 PPM)
Cadmium (Cd)	7440-43-9	0.01% (100 PPM)
Bis(2-Etylhexyl) phthalate(DEHP)	117-81-7	0.1% (1000 PPM)
Benzyl butyl phthalate(BBP)	85-68-7	0.1% (1000 PPM)
Dibutyl Phthalate(DBP)	84-74-2	0.1% (1000 PPM)
Disobutyl Phthalate(DIBP)	84-69-5	0.1% (1000 PPM)

Banned Substances by RoHS Directive 2011/65/EU+2015/863/EU, EN50581:2012

OPHIT will continue to monitor any new amendments/changes to Directive and subsequently review our all products with regards to compliance. OPHIT will also ensure that any new information is communicated to its customers, suppliers and stakeholders as required.

Signature : Jong-Kook, Moon



Title/Issue date : President/July.22.2019

9. REACH

The European REACH Regulation 1907/2006 on Registration, Evaluation, Authorization, and Restriction of Chemicals(REACH), Annex XV II entered into Force in June 2009, and affects all companies producing, Importing, using, or placing Products on the European market. The aim of the REACH regulation is to ensure a high Level of protection of human health and the environment from chemical substances.

OPHIT Co., Ltd substances management system follow and complies with the current revision of the REACH Regulation on the substances as identified by ECHA(European Chemical Agency).

OPHIT Co., Ltd products are considered articles as defined in REACH Article 3(3). These products/articles under normal and reasonable conditions of use do not have intended release of substances. Therefore the requirement in REACH Article 7(1)(b) for registration of substances contained in these products/articles does not apply.

OPHIT Co., Ltd products/articles, do not contain **Substances of very High Concern** or if there **SVHC** in the product/article, the content is less than the 0.1%(wt/wt) as defined by REACH Article 57, Annex XIV, Directive 67/548/EEC. Therefore the requirement in REACH Article 7(2) to notify ECHA if a product/article contains more than 0.1% wt/wt of an SVHC and tonnage exceeding 1 tone per importer per year is not applicable.

OPHIT's European operations do not manufacture or import chemicals, therefore OPHIT Co., Ltd has no obligation to register substances.



Jong-Kook, Moon
President

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