

# PRODUCT DATA SHEET

## DSH

*Single Link Optical DVI Extension System*



## Revision History

Version Number	Revision Date	Page	Description of Changes
1.0	Apr.23, 2012	ALL	Initial Version
2.0	Jul.25, 2012	4, 6	Case Dimension Electrical Specification (Supply Current)
1.2	Oct.28.2019	ALL	Renewal Specification

### PROPRIETARY NOTE

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## TABLE OF CONTENTS

<b>1. General Description .....</b>	<b>4</b>
<b>2. General Specification .....</b>	<b>4</b>
2.1 Specification	
<b>3. Absolute Maximum Ratings .....</b>	<b>5</b>
<b>4. Electrical Specification .....</b>	<b>6</b>
4.1 Transmitter Module	
4.2 Receiver Module	
4.3 Connector Pin Assignment	
4.3.1 Transmitter	
4.3.2 Receiver	
<b>5. Mechanical Specification .....</b>	<b>8</b>
5.1 Transmitter and Receiver Case Dimension	
5.2 Design drawing	
5.3 Connection	
5.4 Optical Cable	
<b>6. Regulatory .....</b>	<b>11</b>
6.1 EMC & Safety Agency approval	
6.1.1 CE-EMC compliance	
6.1.2 FCC compliance	
6.1.3 Eye Safety	
<b>7. Packing Information .....</b>	<b>11</b>
<b>8. RoHS .....</b>	<b>12</b>
<b>9. REACH .....</b>	<b>13</b>

## 1. General Description

**DSH**, optical DVI extension module, is designed to let digital flat panel display signal extend over 300 meters away from host based on DVI standard by optical transmission technology. Its small package and transmit up to four video and one low-speed lane, while simultaneously receiving one low-speed signal, all on one multimode fiber.

- Long distance transmission of digital graphic signal corresponding to T.M.D.S -over 300 meter (1,000ft) by multi-mode one fiber.
- TMDS video signals and EDID data are transmitted by 1 channel multimode optical fiber
- Maximum Support resolution – WUXGA (1920x1200)
- Supports HDCP(Rev 1.1) by DDC channel
- Small size for insertion into internal system
- External power supply for Transmitter is optional. Automatic power switch is included

## 2. General Specification

### 2.1 Specification

Parameter	Symbol	
	Transmitter	Receiver
Optical Converter	850nm, 4Ch Transmit OSA 911nm, 1Ch VCSEL 980nm, 1Ch PIN P/D Diode	850nm, 4Ch Receive OSA 980nm, 1Ch VCSEL 911nm, 1Ch PIN P/D Diode
Input and Output Signal	TMDS Signal (DVI 1.0 standard)	TMDS Signal (DVI 1.0 standard)
Video Bandwidth	3.5Gbps / Channel	
Module Dimension	33 x 12 x 282 mm (W x H x D)	
Module Weight	--	--
Used electrical Connector	DVI-D Male Plug (input)	DVI-D Male Plug (input)
Optical Connector	1 SC Connector	1 SC Connector
Recommended Fiber	50/125um Multi-mode glass-fiber	
Maximum Supported Resolution	WUXGA(1920x1200) / 60Hz	

### 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.

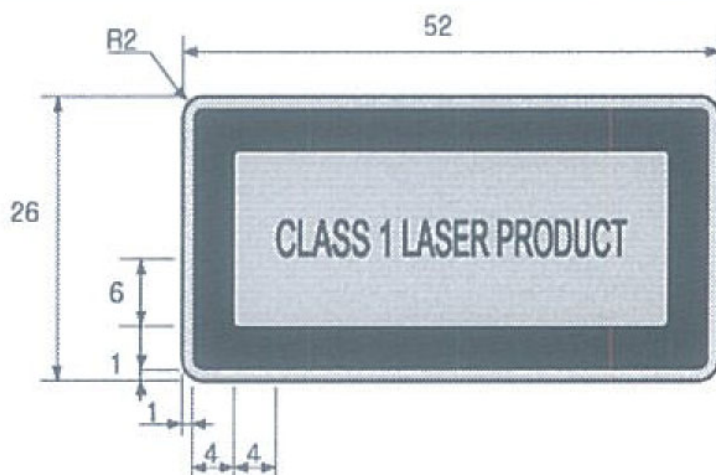
#### 4. Electrical Specification

##### 4.1 Transmitter Module

	Parameter	Symbol	Min	Typ	Max	Units	Condition
POWER	Supply Voltage (Option External Power)	$V_{CC}$	4.5	5.0	5.5	V	
	Supply Current	$I_{CC}$	-	260	300	mA	
	Power Dissipation	$P_O$	-	1.3	1.5	W	
TMD S	Reference voltage for graphic signal	$V_{REF}$	3.1	3.3	3.5	V	
	Single-ended high level input voltage	$V_H$	$V_{REF} - 0.01$		$V_{REF} + 0.01$	V	
	Single-ended low level input voltage	$V_L$	$V_{REF} - 0.6$		$V_{REF} - 0.4$	V	
	Single-ended input swing voltage	$V_{ISWING}$	0.4		0.6	V	
	Single-ended standby input voltage		$V_{REF} - 0.01$		$V_{REF} + 0.01$	V	
	Data Output Load	RLD		50		$\Omega$	

Transmitter module of Model DSH includes 4 channel VCSEL (Vertical Surface Emitting Laser Diode) with 850, 911, 980nm invisible laser radiation.

Transmitter module of DSH is Class 1 Laser Product.



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

4.2 Receiver Module

	Parameter	Symbol	Min	Typ	Max	Units	Condition
<b>P O W E R</b>	Supply Voltage (External Power)	$V_{CC}$	4.5	5.0	5.5	V	
	Supply Current	$I_{CC}$	-	230	250	mA	
	Power Dissipation	$P_O$	-	1.15	1.25	W	
<b>T M D S</b>	Reference voltage for graphic signal	$V_{REF}$	3.1	3.3	3.5	V	
	Single-ended output swing voltage	$V_{OSWING}$	0.4		0.6	V	AC couple
	Data Input Load	RLD		50		$\Omega$	

4.3 Connector Pin Assignment

4.3.1 Transmitter

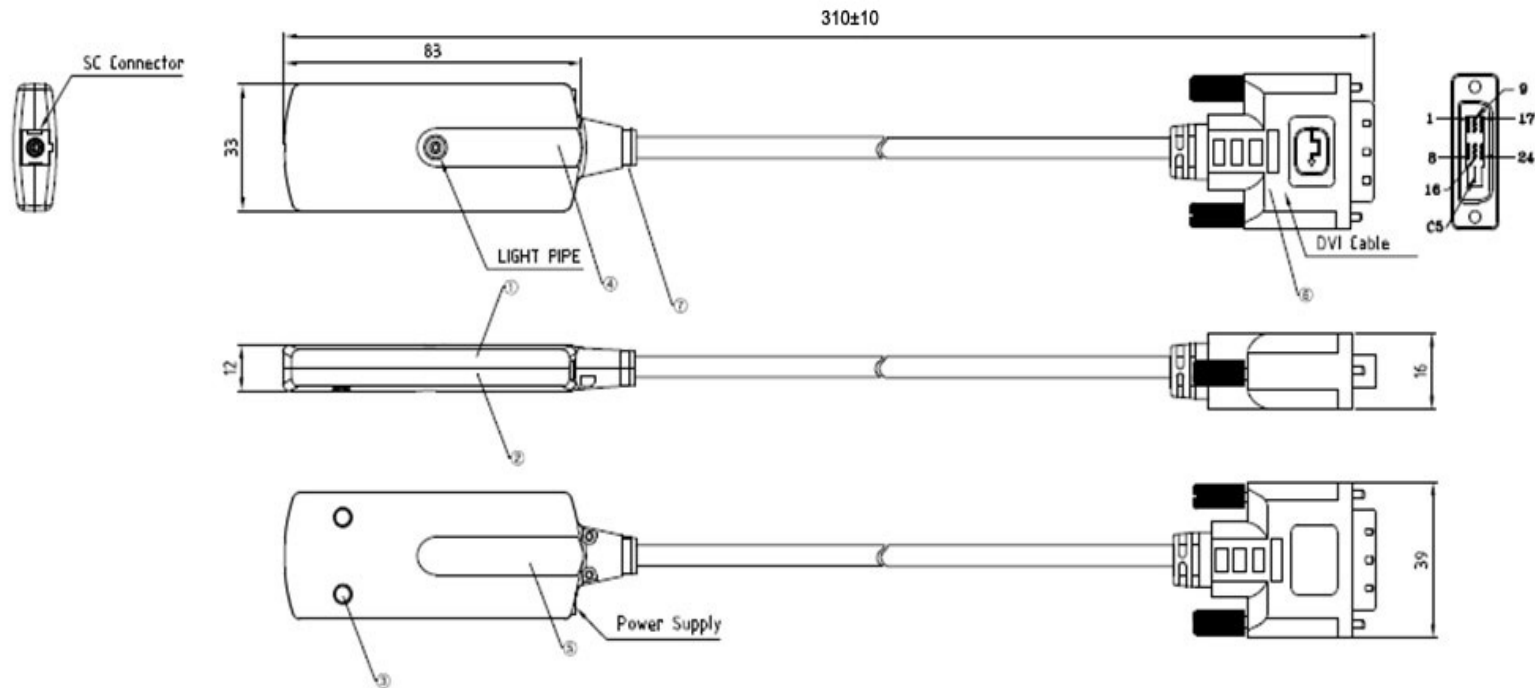
Pin	Signal Assignment	Pin	Signal Assignment	Pin	Signal Assignment
1	T.M.D.S. Data2 -	9	T.M.D.S. Data1 -	17	T.M.D.S. Data0 -
2	T.M.D.S. Data2 +	10	T.M.D.S. Data1 +	18	T.M.D.S. Data0 +
3	T.M.D.S. Data2 Shield	11	T.M.D.S. Data1 Shield	19	T.M.D.S. Data0 Shield
4	No Connect	12	No Connect	20	No Connect
5	No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

## 5. Mechanical Specification

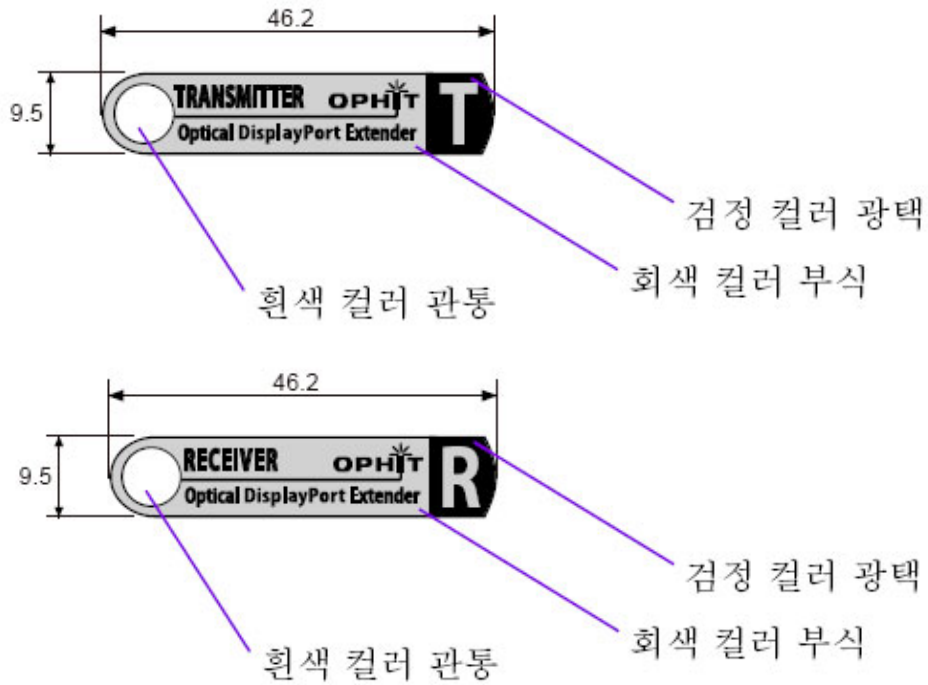
### 5.1 Transmitter and Receiver Case Dimension



NO	PART NAME	NO	PART NAME	NO	PART NAME	NO	PART NAME
1	TOP CASE	4	LOGO LABEL	7	RING LABEL	-	
2	BOTTOM CASE	5	PRODUCT LABEL	-		-	
3	RUBBER PAD	6	DVI COPPER CABLE	-		-	

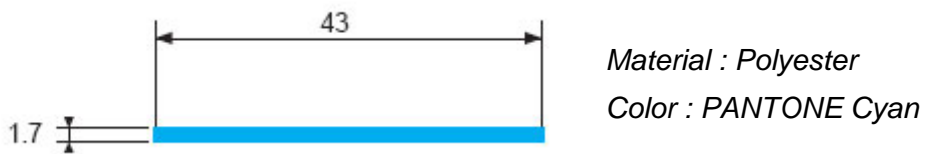


5.2 Design drawing  
5.2.1 Logo Label



NOTE-METAL, Adhesion

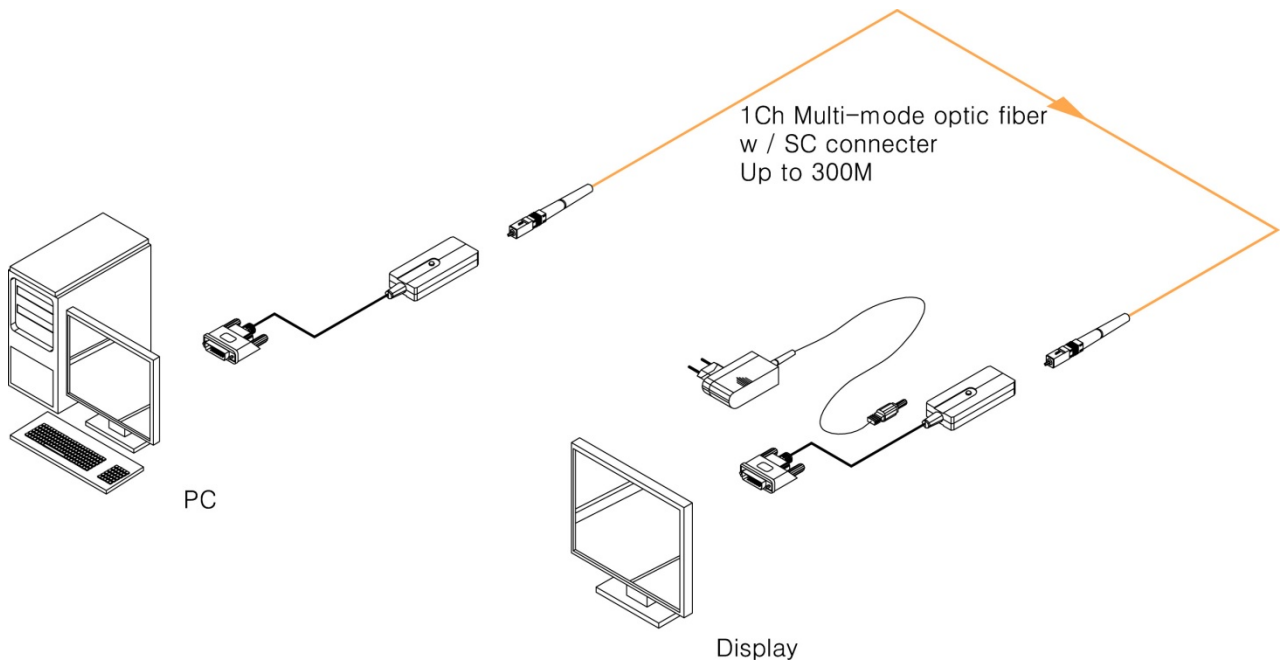
5.2.2 Ring Label  
5.2.2.1 Transmitter



5.2.2.2 Receiver

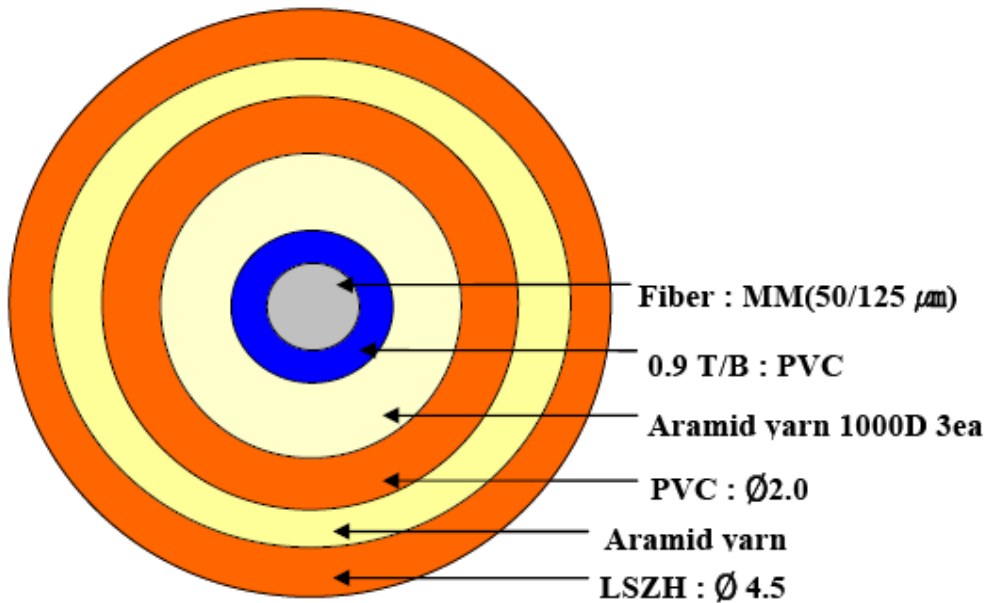
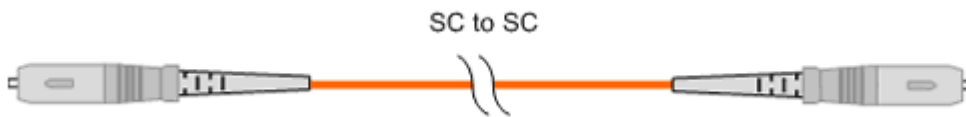


5.3 Connection



5.4 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 EN55022:2010/AC 2011, EN55024:2010, EN61000-3-2:2006+A2:2009 and EN61000-3-3:2008

#### 6.1.2 FCC compliance:

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

#### 6.1.3 Eye Safety

CLASS 1 LASER PRODUCT-IEC60825-1:2007(2<sup>nd</sup> Edition)

## 7. Packing Information

Set(Unpacking, DSH Only)	310.0mm*33.0mm*12.0mm	85.0g
Package(1Set, Inner Box Packing)	350.0mm*177.0mm*62.0mm	600.0g
Package(Multi, 15PCS Packing)	595.0mm*305.0mm*345.0mm	10.5Kg

## 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-Ethylhexyl) 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)
Diisobutyl 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**

*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.



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Jong-Kook, Moon  
President

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