

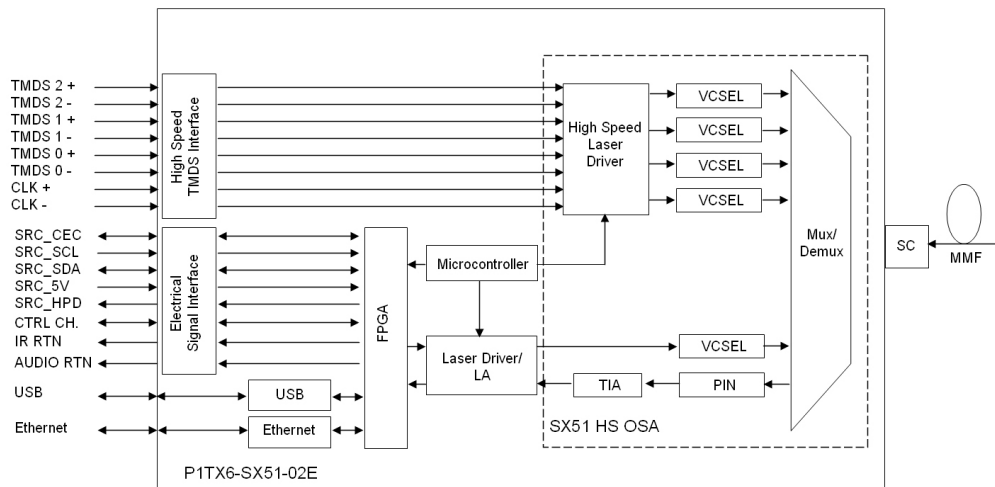
## P1TX6B-SX51-02E Product Specification Sheet

<b>ORIGINATOR:</b>	<b>C. Eng</b>	<b>DATE:</b>	<b>10/30/2012</b>
Omron Network Products	<b>P1TX6B-SX51-02E Product Specification Sheet</b>	<b>DOCUMENT NO. DOC002329</b>	<b>REV A</b>
<b>SHEET 1 OF 8</b>			

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## 1.0 Features

- 5 transmit lanes and 1 receive lane over 1 multimode fiber
- Compatible with HDMI™ compliant sources and sinks
- Scalable to HDMI™ 1080P 16-bit color
- Accepts TMDS inputs directly into its 40 pin plug-down connector
- Supports HDCP/EDID/CEC/ARC consumer electronics functionality
- Supports 10/100 Ethernet networking functionality
- Supports USB 1.1 peripheral interconnect functionality
- Supports Infrared pass-through from the sink to the source
- Available 1Mbps bi-directional User Data Link
- Automatic laser disable upon fiber disconnect



This device is **EXTREMELY SENSITIVE** to Electrostatic Discharge (ESD). At a minimum, all handling must be performed in accordance with an ANSI-compliant ESD Control Program (ANSI/ESD S20.20-2007) to mitigate possible ESD-induced damage. Reliability and life of the device will be adversely affected if these precautions are not met.



This device is a Class 3R Laser device (per IEC 60825-1:2007) and can cause damage to eye sight if used improperly. Refer to ANSI Z136 for proper handling and usage of Class 3R devices.

HDMI, the HDMI Logo and High-Definition Multimedia Interface are trademarks or registered trademarks of HDMI Licensing LLC.



<b>ORIGINATOR:</b>		<b>C. Eng</b>		<b>DATE:</b>		<b>10/30/2012</b>	
Omron Network Products	<b>P1TX6B-SX51-02E</b> <b>Product Specification Sheet</b>			<b>DOCUMENT NO.</b>		<b>REV</b>	
				<b>DOC002329</b>		<b>A</b>	
<b>SHEET 2 OF 8</b>							

CONFIDENTIAL INFORMATION

## 2.0 Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Units
Storage Temperature <sup>1, 3</sup>	Tst				°C
3.3V Supply Voltage	VCC1		3.3		V
1.8V Supply Voltage	VCC2		1.8		V
Input Pin Voltage					V
Operating Surface Temperature <sup>2</sup>	Ta				°C
Operating Humidity <sup>3</sup>	RH				%
Durability – SC Connector			200		cycles
Durability – Plug-down Connector			50		cycles

## 3.0 Optical Characteristics – High-speed Lanes

Parameter (per lane)	Symbol	Min	Typ	Max	Units
Average Optical Power, per Lane <sup>4</sup>	Pout		-1.5		dBm
Optical Modulation Amplitude			0.0		dBm
Center Wavelength – Lane 0			778		nm
Center Wavelength – Lane 1			800		nm
Center Wavelength – Lane 2			825		nm
Center Wavelength – Lane 3			850		nm

<sup>1</sup> Stresses listed may be applied without causing damage. Functionality at or above the values listed is not implied. Exposure to these values for extended periods may affect reliability.

<sup>2</sup> See outline drawing for measurement point.

<sup>3</sup> Non condensing, 80% RH.

<sup>4</sup> I= 5mA, T=25C.

<b>ORIGINATOR:</b>		<b>C. Eng</b>		<b>DATE:</b>		<b>10/30/2012</b>	
Omron Network Products	<b>P1TX6B-SX51-02E</b> <b>Product Specification Sheet</b>			<b>DOCUMENT NO.</b>		<b>REV</b>	
				<b>DOC002329</b>		<b>A</b>	
<b>SHEET 3 OF 8</b>							

CONFIDENTIAL INFORMATION

#### 4.0 Electrical Specifications – High-speed Lanes

Parameter	Symbol	Min	Typ	Max	Units
Data Rate per Lane <sup>5</sup> P1TX6-SX51V-02E P1TX6-SX51D-02E				1.65 3.40	Gb/s
Total Jitter (RMS), per lane <sup>6</sup>	T <sub>J1</sub>		10		ps
Input Differential Impedance			100		ohm
Differential Input Voltage <sup>7</sup>					mVp-p
Single-ended Input Voltage					mVp-p
Common mode input voltage (AC-coupled input)			2.6		V V
Operating 3.3V Supply Voltage	VCC1		3.30		V
Operating 3.3V Supply Current	ICC1		410		mA
Operating 1.8V Supply Voltage	VCC2		1.8		V
Operating 1.8V Supply Current	ICC2		194		mA

#### 5.0 Optical Characteristics – Bi-directional Lanes

Laser Parameter	Symbol	Min	Typ	Max	Units
Wavelength - Lane 4			911		nm
Data Rate			400		Mb/s
Average Optical Power <sup>4</sup>	P <sub>avg</sub>		-1.5		dBm

Photodiode Parameter	Symbol	Min	Typ	Max	Units
Wavelength - Lane 5			980		nm
Data Rate			400		Mb/s
Peak Optical Input Power	P <sub>in</sub>				dBm

<sup>5</sup> Measured with input signals conforming to HDMI™ rev 1.3a, section 4.2.4, figure 4-18.

<sup>6</sup> Based on a jitter-free source

<sup>7</sup> Differential CML compatible inputs

<b>ORIGINATOR:</b>		<b>C. Eng</b>		<b>DATE:</b>		<b>10/30/2012</b>	
Omron Network Products	<b>P1TX6B-SX51-02E</b> <b>Product Specification Sheet</b>			<b>DOCUMENT NO.</b>		<b>REV</b>	
				<b>DOC002329</b>		<b>A</b>	
<b>SHEET 4 OF 8</b>							

CONFIDENTIAL INFORMATION

## 6.0 Electrical Specifications – Low speed

### 6.1 Infrared Pass-through Electrical

IR Pin Parameters	Symbol	Min	Typ	Max	Units
Modulation Frequency	$DR_{IR}$			50	khz
Output Voltage Low	$V_{OL}$	0.0		0.4	V
Output Voltage High	$V_{OH}$	$V_{CC1} - 0.4$		$V_{CC1}$	V

### 6.2 Audio Return Channel (ARC) Electrical Parameters<sup>8</sup>

ARC Pin Parameters	Symbol	Min	Typ	Max	Units
Data Rate <sup>9</sup>	$DR_{ARC}$			20	Mbps
Bit Cell	UI	50			ns
Jitter			0.2		UI
Output Voltage Low	$V_{OL}$	0.0		0.4	V
Output Voltage High	$V_{OH}$	$V_{CC1} - 0.4$		$V_{CC1}$	V

### 6.3 HDMI, USB, Ethernet Electrical Parameters

HDMI, USB and Ethernet are compatible with published standards

<sup>8</sup> The Audio Return Channel will pass a bit for bit copy of a data stream adhering to IEC 60958-1 Edition 3.0.

<sup>9</sup> Audio Return Channel signals are LVCMOS with 8mA of drive capability

<b>ORIGINATOR:</b>		<b>C. Eng</b>		<b>DATE:</b>		<b>10/30/2012</b>	
Omron Network Products	<b>P1TX6B-SX51-02E</b> <b>Product Specification Sheet</b>			<b>DOCUMENT NO.</b>		<b>REV</b>	
				<b>DOC002329</b>		<b>A</b>	
<b>SHEET 5 OF 8</b>							

CONFIDENTIAL INFORMATION

## 7.0 Status Signal Functional Table<sup>10</sup>

The serial LED output from the P1TX6B-SX51-02E is designed to drive the SDI input of the AP3156 from Diodes Incorporated. A programmable logic device or ASIC may be used to monitor serial LED output and derive LED Status without utilizing the AP3156.

The following numbers referenced below will map directly into the D1-D6 outputs of the AP3156.

LED Position	Function	Description
D6	Off	Power Off or FPGA not initialized
	Flash	FPGA initialized but fiber link not detected
	On	FPGA initialized and fiber link up
D5	Off	No video
	Flash	Video detected, no HDMI mode
	On	Video detected and HDMI mode
D4	Off	HDMI 5v not detected
	Flash	HDMI 5v detected and no Hot Plug
	On	HDMI 5v and Hot Plug detected
D3	Off	Ethernet not connected
	Flash	Ethernet connected and Auto-Negotiation Failed
	On	Ethernet good link
D2	Off	Audio Return Channel inactive
	Flash	Not Implemented (This LED doesn't flash)
	On	Audio Return Channel data detected
D1	Off	USB Host not connected
	Flash	USB Host connected and no USB function
	On	USB Host and function connected

<sup>10</sup> Status signal table represents typical output. Variances in status signals may occur between different manufacturers and/or models of sources and sinks. Reference the -02E Information Package for diode wiring circuit.

<b>ORIGINATOR:</b>		<b>C. Eng</b>	<b>DATE:</b>	<b>10/30/2012</b>
Omron Network Products	<b>P1TX6B-SX51-02E Product Specification Sheet</b>		<b>DOCUMENT NO.</b>	<b>REV</b>
			<b>DOC002329</b>	<b>A</b>
<b>SHEET 6 OF 8</b>				

CONFIDENTIAL INFORMATION

## 8.0 Laser Safety

The P1TX6-SX51-02 meets Class-3R requirements. Use proper eye protection and handling practices per ANSI Z136.

## 9.0 Compatible Standards

The P1TX6-SX51-02E has been evaluated to interoperate with devices adhering to the following standards:

HDMI Specification Version 1.3a<sup>11</sup>  
 HDMI Compliance Test Specification Version 1.3c  
 High-Bandwidth Digital Content Protection (HDCP) Version 1.3<sup>11</sup>  
 High-Bandwidth Digital Content Protection Spec Compliance Test Specification Revision 1.1  
 Ethernet Specification, IEEE 802.3-2005, 10BASE-T/100BASE-T  
 Universal Serial Bus Specification Rev 1.1  
 IEC 60958-1 Edition 3.0

## 10.0 Patents

This product contains the following patents in addition to patents pending: 6201908, 6396978, 6456757, 6558046, 6572278, 6652161.

<sup>11</sup> Modules are not warranted for interoperability with all HDMI sources and sinks

<b>ORIGINATOR:</b>		<b>C. Eng</b>	<b>DATE:</b>	<b>10/30/2012</b>
Omron Network Products	<b>P1TX6B-SX51-02E Product Specification Sheet</b>		<b>DOCUMENT NO.</b>	<b>REV</b>
			<b>DOC002329</b>	<b>A</b>
<b>SHEET 7 OF 8</b>				

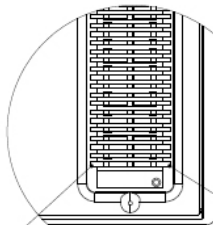
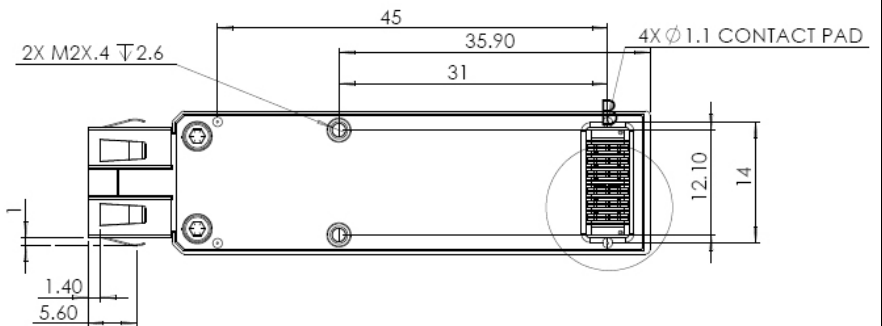
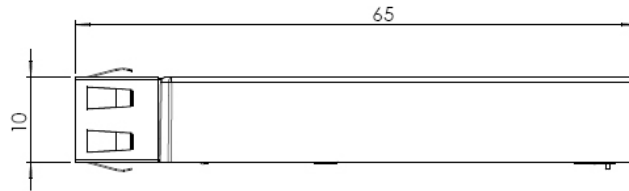
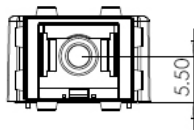
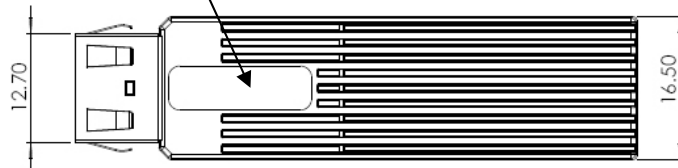
CONFIDENTIAL INFORMATION

## 11.0 Dimensions

The TX51-02E Module is designed to work with a standard SC ferrule only. Insertion of any other type may result in damage. For dust cap information, contact L-Com (DSTCP-SC).

Dimensions and orientation are for reference only.

\*\*Temperature measurement point



PIN NO. 2  
**DETAIL B**  
 SCALE 4 : 1  
 PIN NO. 1

All dimensions are in mm.

<b>ORIGINATOR:</b>		<b>C. Eng</b>		<b>DATE:</b>		<b>10/30/2012</b>	
Omron Network Products	<b>P1TX6B-SX51-02E</b> <b>Product Specification Sheet</b>			<b>DOCUMENT NO.</b>		<b>REV</b>	
				<b>DOC002329</b>		<b>A</b>	
<b>SHEET 8 OF 8</b>							

CONFIDENTIAL INFORMATION