



## 10.3GBPS LR/LW DUAL PORT FIBER BYPASS MODULE

### Product Description

The LR/LW Dual port fiber single bypass modules is design expressly for Intrusion Prevention System (IPS) provides complete visibility to network traffic, It also introduces a point of failure should the IPS lose power, cable fail or application freeze. The module design for PCI Express X8 interface, which means it can support 10.3Gbit/s in full duplex mode per port of data transfer rate and Single-mode fiber operations. LR/LW Quad port fiber bypass modules designed to be compliant digital diagnostic monitoring function: Temperature, VCC, TX optical power, TX laser bias current, and RX received optical power. The post-amplifier of the LR/LW Dual port fiber single bypass module also includes a Loss of Signal (LOS) circuit that provides a TTL logic-high output when the received optical level is below a preset LOS Assert threshold.



### Features

- Compliant with IEEE 802.3ae 10GBASE-SR
- Compliant with IEEE 802.3ae 10GBASE-SW
- Link Distances at 10.3Gbps 300m links with 50/125um OM-3 MMF Cable
- EEPROM with Series ID Function
- Quad LC Connector interface with optical Bypass Function
- Laser Class 1 Product with comply with Requirements of IEC 60825-1 and IEC 60825-2
- LED indicate operation function

### Applications

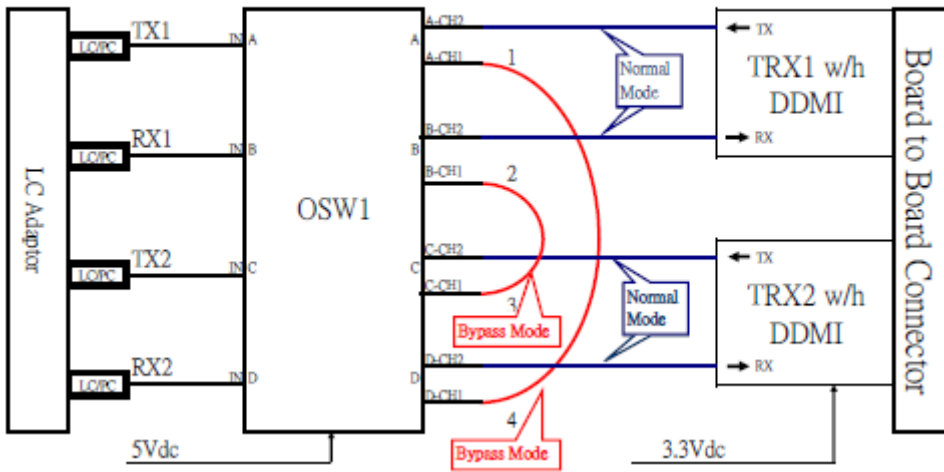
- In-Line traffic Monitoring, Analyzing and Optimization
- Intrusion Prevention System
- Quality of Service
- In-Line Security
- Load balance
- Web Acceleration Appliances

### LASER SAFETY

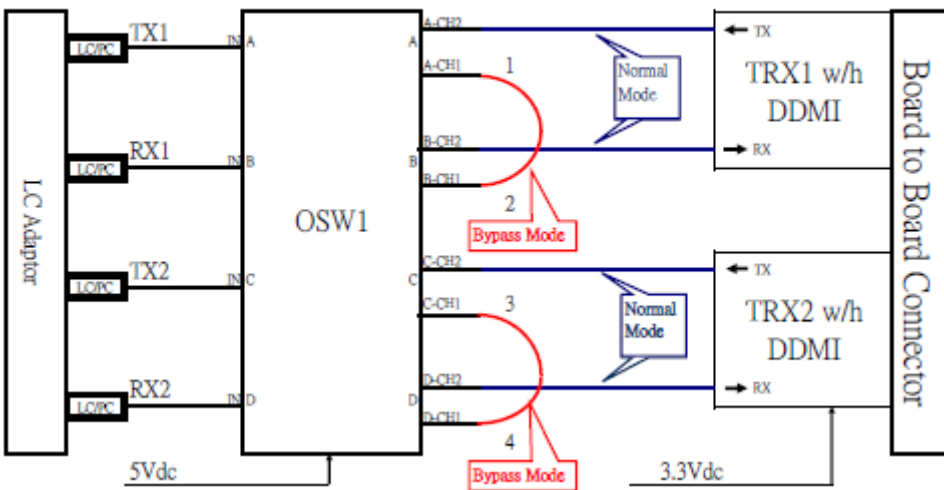
This Single-mode Quad Port Fiber Bypass Module is a Class 1 laser product. It complies with IEC 68025 and FDA 21 CFR 1040.10 and 1040.11. The module must be operated within the specified temperature and voltage limits. The optical port of the module shall be terminated with an optical connector or with a dust plug.

**LR/LW Quad Port Bypass Module – Optical Path Portion**

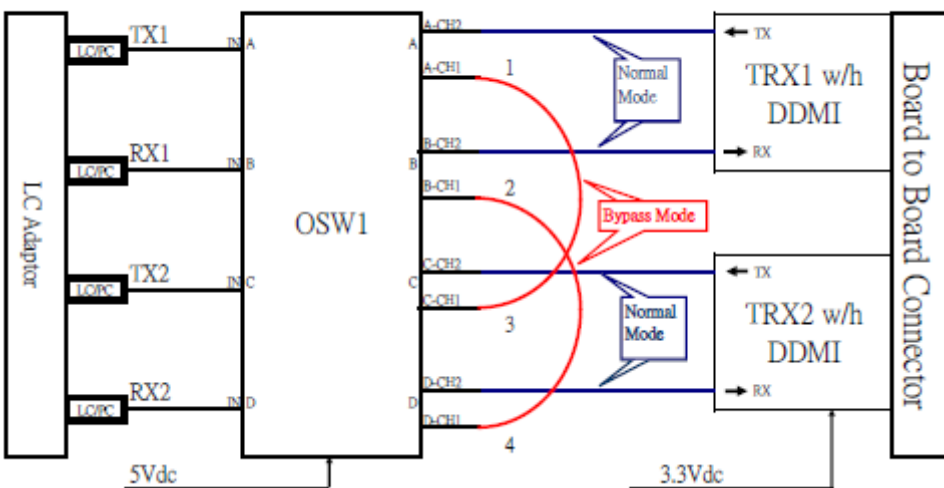
Dual Port One Bypass Path is 1<->4 & 2<->3



Dual Port One Bypass Path is 1<->2 & 3<->4



Dual Port One Bypass Path is 1<->3 & 2<->4





## Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Storage Temperature	Ts	-40		85	°C	
Supply Voltage	Vcc	0		5	V	

## Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Case Operation Temperature	Ts	-5		70	°C	1
+5V Supply Voltage	Vcc5	4.75		5.25	V	Vcc5,6
+3.3V Supply Voltage	Vcc3	3.135		3.465	V	Vcc1,2,3,4
+5V Supply Current	Icc5			500	mA	Icc5,6
+3.3V Supply Current	Icc3			1200	mA	Icc1,2,3,4
Relative Humidity	—	5		85	%	2

Note :

1. Consuming Temperature
2. Non Condensation

## Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
<b>Transmitter</b>						
Differential Input Impedance	Z <sub>d</sub>		100		Ω	1
Differential Input Voltage Swing	V <sub>DIFF</sub>	180		700	mV	1
Differential Input Voltage	V <sub>DT</sub>	0.5		2.4	V	1
Disable Input-High	V <sub>DISH</sub>	2.4		V <sub>cc</sub> +0.3	V	
Disable Input-Low	V <sub>DISL</sub>	0		0.8	V	
Fault Pull Up Resistor	R <sub>TX_FAULT</sub>	4.7		10	KΩ	2
Fault Output-High	V <sub>TXFH</sub>	2.4		V <sub>cc</sub>	V	2
Fault Output-Low	V <sub>TXFL</sub>	0		0.5	V	2
TX_DISABLE Asserted Time	t <sub>OFF</sub>			10	μsec	
TX_DISABLE Deasserted Time	t <sub>ON</sub>			1	msec	
Time to initialize, include reset of TX_FAULT	t <sub>init</sub>			300	msec	
TX_FAULT from fault to assertion	t <sub>fault</sub>			100	μsec	
TX_DISABLE time to reset	t <sub>reset</sub>	10			μsec	
<b>Receiver</b>						
Differential Output Impedance	Z <sub>d</sub>		100		Ω	1
Differential Output Voltage	V <sub>DR</sub>	0.35		0.85	V	3
LOS Load Resistor	R <sub>RX_LOS</sub>	4.7		10	KΩ	2
LOS Output Voltage-High	V <sub>LOSH</sub>	2.4		V <sub>cc</sub>	V	2



LOS Output Voltage-Low	V <sub>LOSL</sub>	0		0.5	V	2
LOS Asserted Time (Transmitter off to on)	t <sub>A,RX_LOS</sub>			100	μsec	4
LOS Deasserted Time(Transmitter on to off)	t <sub>D,RX_LOS</sub>			100	μsec	4
<b>Optical Bypass Switch</b>						
Operation Voltage	V <sub>SW</sub>	4.5	5.0	5.5	V	
Operation Current	I <sub>SW</sub>		80	100	mA	
Latching Voltage-High	V <sub>LATH</sub>	4.5	5.0	5.5	V	
Latching Voltage-Low	V <sub>LATL</sub>	0		0.8	V	
Latching Resistance	R <sub>LAT</sub>		125		Ω	±10%
Switching Time (Input Pulse ≥20ms)	t <sub>ST</sub>			5.0	msec	
<b>Timing</b>						
Series ID Clock Rate	F <sub>serial_clock</sub>			100	KHz	DDMI function

Note :

1. Internally AC couples and terminated to 100-Ohms differential load.
2. Pull up to Vcc on Host-Board.
3. Internally AC coupled, but requires a 100-Ohms differential termination at or internal to Serializer/Deserialer.
4. These are 20%~80% values.

## Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
<b>Transmitter</b>						
Output Optical Power (AVG.)	P <sub>OUT</sub>	-8		0.5	dBm	1 (9/125um)
Optical Modulation Amplitude	OMA	-5.2			dBm	
Center Wavelength	λ <sub>c</sub>	1270	1310	1355	nm	
Spectral Width (RMS)	Δλ			1.0	nm	-20dB width
Side Mode Suppression Ratio	SMSR	30			dB	
Extinction Ratio	ER	3.5				1 (9/125um)
Transmitter and Dispersion Penalty	TDP			3.9	dB	
Relative Intensity Noise	RIN			-128	dB/Hz	
Output Eye	Compliant with IEEE802.3ae					
Max. Pout TX-DISABLE Asserted	P <sub>OFF</sub>			-35	dB	
<b>Receiver</b>						
Optical Input Power (Over Load)	P <sub>MAX</sub>	0.5			dBm	2 (9/125um)
Receiver Sensitivity (AVG.) (BER<10E-12 and PRBS=2 <sup>31</sup> -1)	P <sub>IN1</sub>			-14.4	dBm	2 (9/125um)
Receiver Sensitivity (OMA) (BER<10E-12 and PRBS=2 <sup>31</sup> -1)	P <sub>IN2</sub>			-12.6	dBm	2 (9/125um))
Stressed Receiver Sensitivity (OMA) (BER<10E-12 and PRBS=2 <sup>31</sup> -1)	P <sub>IN3</sub>			-10.3	dBm	2 (9/125um)



Center Wavelength	$\lambda_c$	1260		1560	nm	
Optical Return Loss	ORL			-12	dB	
<b>Parameter</b>	<b>Symbol</b>	<b>Min.</b>	<b>Typ.</b>	<b>Max.</b>	<b>Unit</b>	<b>Note</b>
LOS Assert (AVG.)	$P_A$			-16	dBm	
LOS De-Assert (AVG.)	$P_D$	-28			dBm	
LOS Hysteresis	$P_A-P_D$	0.5		3.0	dB	
<b>Optical Bypass Switch</b>						
Center Wavelength	$\lambda_c$	1260		1560	nm	
Insertion Loss (Bypass Mode)	IRL	2.0		4.0	dB	3 (9/125um)
Return Loss (Bypass Mode)	ORL			-50	dB	2 (9/125um)
Center Wavelength	$\lambda_c$	1260		1560	nm	

Note :

1. Output power is power couples into a 9/125um single-mode fiber.
2. Normal Mode (Bypass Mode Off).
3. Bypass Mode (Normal Mode Off).
4. Pre IEE802.3ae. Equivalent to -13.3dBm average power at Infinite ER