

TITLE**Transceiver 1G SFP EZX 120km****1. SCOPE**

ZCables' 1G EZX 120km Transceiver is a high performance, cost effective modules, which is optimized for 1000BASE-EZX, and transmission distance up to 120km on SMF. The transceiver consists of two sections: The transmitter section incorporates an 1550nm DFB driver. The receiver section consists of a PIN photodiode integrated with a transimpedance preamplifier (TIA). The module is hot pluggable into the 20-pin connector.

The high-speed electrical interface is base on low voltage logic, with nominal 100 Ohms differential impedance and AC coupled in the module. The optical output can be disabled by LVTTTL logic high-level input of TX_DIS. Loss of signal (RX_LOS) output is provided to indicate the loss of an input optical signal of receiver.

A serial EEPROM in the transceiver allows the user to access transceiver monitoring and configuration data via the 2-wire SFP Management Interface. This interface uses a single address, A0h, with a memory map divided into a lower and upper area. Basic digital diagnostic (DD) data is held in the lower area while specific data is held in a series of tables in the high memory area.

2. PRODUCT FEATURES

- Support Rate 1Gps/1.25Gbps
- Up to 10km Transmission Distance on SM Fiber
- 1550nm DFB and PIN Receiver
- SFI Electrical Interface
- 2-Wire Interface for Integrated Digital Diagnostic Monitoring
- SFP MSA Package with Duplex LC Connector
- Hot Pluggable
- Very Low EMI and Excellent ESD Protection
- +3.3V Power Supply
- Power Consumption Less then 1W
- Operating Case Temperature: -40~+85°C

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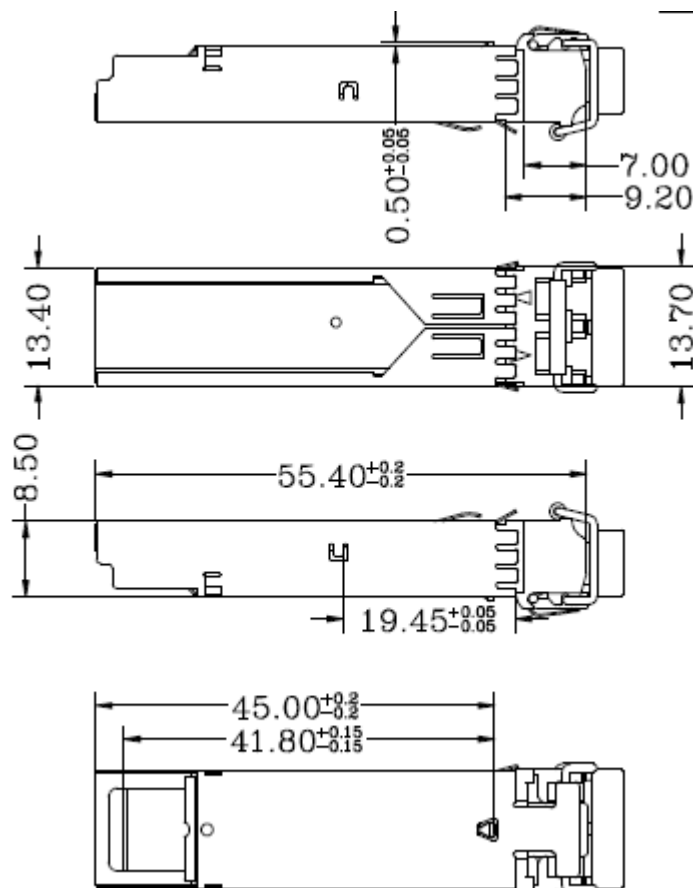
3. PRODUCT DESCRIPTION

3.1 PRODUCT NAME AND SERIES NUMBER(S)

SFP 1G EZX Transceiver

Part Number	Data Rate	Wavelength (nm)	Distance	Media	Power (dBm)	Sen. (dBm)	Connector	Tem.
ZFTBX2B1550A1ST	1G	1550	120 km	SMF	0~+5	-29	LC	C

3.2 DIMENSIONS, MATERIALS, PLATINGS AND MARKING



4. APPLICABLE DOCUMENTS AND SPECIFICATIONS

- Data Center
- 1.25Gbps IEEE 802.3 1000BASE-EZX

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5. QUALIFICATION

- Electrostatic Discharge (ESD) to the Electrical Pins
- Electrostatic Discharge (ESD) to the Duplex LC Receptacle
- RoHS compliance

6. Absolute Maximum Ratings & Recommended Operating Conditions
Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	TS	-40	+85	°C
Supply Voltage	VCC3	-0.5	3.6	V
Relative Humidity(Non-condensing)	RH	5	85	%
RX Input Average Power	Pmax	-	-3	dBm

Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit
Operating Case Temperature(I-temp)	T _I	-40	-	85	°C
Power Supply Voltage	VCC3	3.1	3.3	3.5	V
	ICC3	-	-	300	mA
Power Dissipation	P _D	-	-	1	W
Data Rate	-	-	1.25/1.0625	-	Gbps
Transmission Distance	SMF	-	-	120	km

Transmitter Operating Characteristic-Optical, Electrical

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Center Wavelength	λ _C	1520	1550	1580	nm	Note1
Laser Off Power	P _{off}	-	-	-30	dBm	

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Average Optical Power	Pavg	0	-	+5	dBm	
RMS spectral width	-	-	-	1	nm	
Extinction Ratio	ER	9	-	-	dB	
Transmitter Dispersion Penalty	TDP	-	-	1	dB	
Operating Data Rate	-	-	1.25/1.0625	-	Gbps	
Optical Eye Mask Margin		10			%	
Tx Input Diff Swing	VI	300		2200	mV	
Tx_Disable	Disable		2		VCC	V
	Enable		VEE		VEE+ 0.8	V

Notes:

1. Average optical power shall be measured using the methods specified in TIA/EIA-455-95.

Receiver Operating Characteristic-Optical, Electrical

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Center Wavelength	λ_r	1520	1550	1580	nm	
Receiver Sensitivity (OMA)				-29	dBm	1
LOS Assert	LOS A	-45		-	dBm	
LOS Dessert	LOS D			-31	dBm	
LOS Hysteresis	LOSH	0.5		6	dB	
Overload	Pin	-6			dBm	
Return Loss of Receiver		12			dB	
Operating Data Rate			1.25/1.0625		Gbps	
Rx Output Diff Swing	Vo	500		1200	mV	

Notes:

1. Receiver sensitivity is informative. shall be measured with conformance test signal for BER = 1×10^{-12} .

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Control and Status I/O Timing Characteristics

Parameter	Symbol	Min.	Max.	Unit	Note
TX Disable Assert Time	t_off		100	µs	Note1
TX Disable Negate Time	t_on		2	ms	Note2
Time to initialize including reset of TX_Fault	t_init		300	ms	Note3
TX Fault Assert Time	t_fault		1	ms	Note4
Tx_Fault Reset	t_reset	10		µs	Note5
LOS Assert Time	t_loss_on		100	µs	Note6
LOS Deassert Time	t_loss_off		100	µs	Note7
Serial ID Clock Rate	f_serial_clock	100	400	kHz	

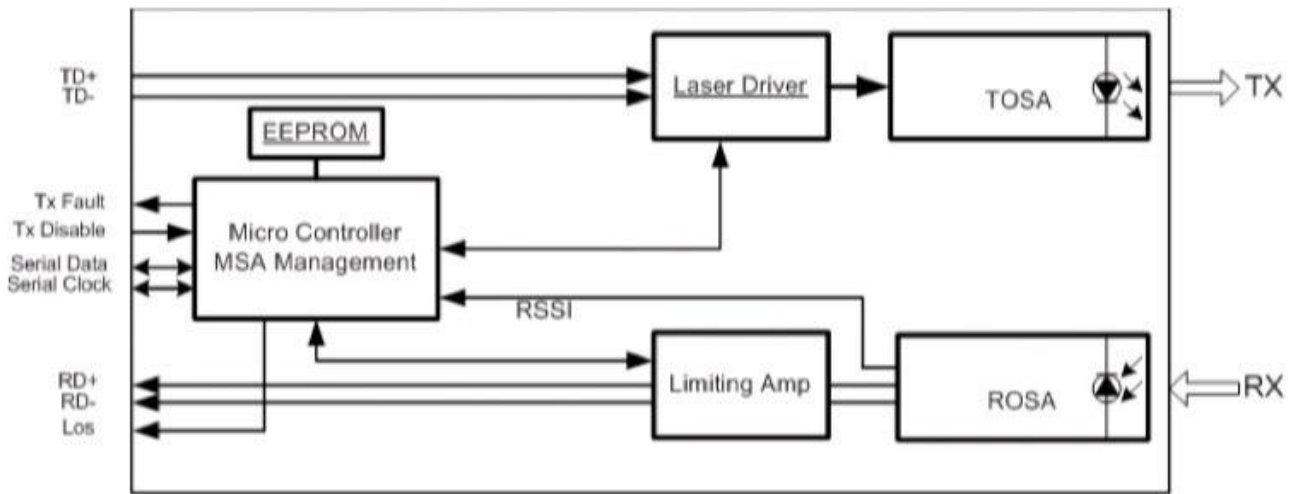
Notes:

1. Time from rising edge of TX Disable to when the optical output falls below 10% of nominal
2. Time from falling edge of TX Disable to when the modulated optical output rises above 90% of nominal
3. From power on or negation of TX Fault using TXDisable
4. Time from fault to TX fault on
5. Time TX Disable must be held high to reset TX_fault
6. Time from LOS state to RX LOS assert
7. Time from non-LOS state to RX LOS deassert.
8. Time from rising or falling edge of Rate Select input until receiver bandwidth is in conformance with appropriate specification

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14		VeeR	Module Receiver Ground	1
15		VccR	Module Receiver 3.3 V Supply	2
16		VccT	Module Transmitter 3.3 V Supply	2
17		VeeT	Module Transmitter Ground	1
18	CML-I	TD+	Transmitter Non-Inverted Data Input	3
19	CML-I	TD-	Transmitter Inverted Data Input	3
20		VeeT	Module Transmitter Ground	1

Block Diagram of Transceiver



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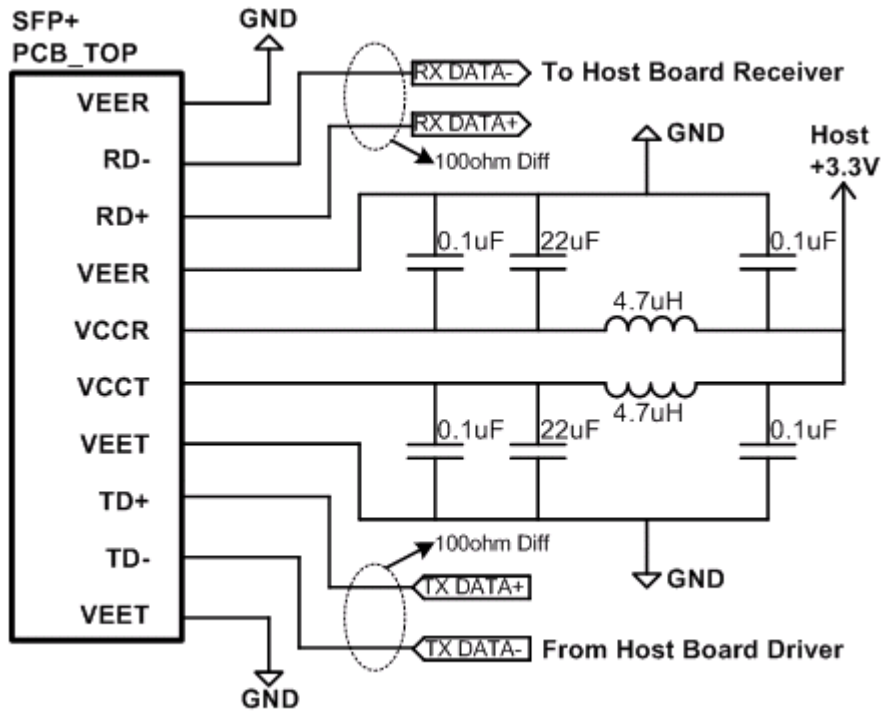
TITLE**Transceiver 1G SFP EZX 120km*****Transmitter Section***

The transmitter converts 1.25Gbit/s serial PECL or CML electrical data into serial optical data compliant with the 1G BASE standard. An open collector compatible Transmit Disable (Tx_Dis) is provided. A logic "1," or no connection on this pin will disable the laser from transmitting. A logic "0" on this pin provides normal operation. The transmitter has an internal automatic power control loop (APC) to ensure constant optical power output across supply voltage and temperature variations. An open collector compatible Transmit Fault (Tx_Fault) is provided. TX_Fault is a module output contact that when high, indicates that the module transmitter has detected a fault condition related to laser operation or safety. The TX_Fault output contact is an open drain/collector and shall be pulled up to the Vcc_Host in the host with a resistor in the range 4.7-10 kΩ. TX_Disable is a module input contact. When TX_Disable is asserted high or left open, the SFP module transmitter output shall be turned off. This contact shall be pulled up to VccT with a 4.7 kΩ to 10 kΩ resistor.

Receiver Section

The receiver converts 1.25Gbit/s serial optical data into serial PECL/CML electrical data. An open collector compatible Loss of Signal is provided. Rx_LOS when high indicates an optical signal level below that specified in the relevant standard. The Rx_LOS contact is an open drain/collector output and shall be pulled up to Vcc_Host in the host with a resistor in the range 4.7-10 kΩ, or with an active termination. Power supply filtering is recommended for both the transmitter and receiver. The Rx_LOS signal is intended as a preliminary indication to the system in which the SFP is installed that the received signal strength is below the specified range. Such an indication typically points to non-installed cables, broken cables, or a disabled, failing or a powered off transmitter at the far end of the cable.

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Recommended Interface Circuit