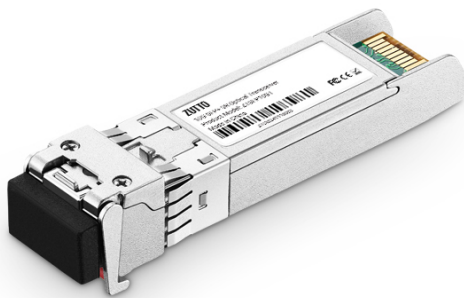


ZUTTO System

ZT10SPX-ZR002 Data Sheet



Zutto ZT10SPX-ZR002

10G SFP+ ZR Optical Transceiver / Up to 80 km on 9/125µm SMF

The Zutto ZT10SPX-ZR002 is a 10G SFP+ ZR optical transceiver designed for ultra-long-range connectivity in Ethernet, SONET/SDH, and Fibre Channel applications. Supporting data rates up to 11.3Gbps, it enables seamless transmission over single-mode fiber for distances up to 80km. Featuring a cooled 1550nm EML transmitter and a high-sensitivity APD receiver, this transceiver delivers exceptional performance in demanding environments.

Compliant with SFF-8431 and SFF-8432 standards, the ZT10SPX-ZR002 includes hot-pluggable functionality and built-in digital diagnostics for easy integration and monitoring. With low power consumption of under 1.7W and a robust operating temperature range (0°C to 70°C), it offers a reliable and efficient solution for long-haul networking.

Features

- Supports 1.0 to 11.3Gb/s bit rates
- Hot-Pluggable SFP+ form factor
- Duplex LC connector
- Cooled 1550nm EML Transmitter, APD Receiver
- Up to 80 km on 9/125µm SMF
- Built-in digital diagnostic functions
- Power Supply :+3.3V
- Power consumption<1.7W
- Operating case temperature: 0~ 70°C
- RoHS compliant

Applications

- 10G Ethernet
- SDH/SONET
- Fibre Channel

Key Features

The Zutto ZT10SPX-ZR002 optical transceiver module showcases several main values that make it a standout choice in its field.



Ultra-Long-Range Connectivity

Supports transmission up to 80km on single-mode fiber, making it ideal for long-distance applications.



High-Speed Data Rates

Delivers reliable speeds up to 11.3Gbps, ensuring top-tier performance for bandwidth-intensive networks.



Energy Efficiency

Consumes less than 1.7W, providing an energy-conscious option for extensive network deployments.



Advanced Diagnostics and Easy Deployment

Features built-in digital diagnostics and hot-pluggable design for seamless monitoring and integration.

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit
Storage Temperature	T _S	-40		+85	°C
Case Operating Temperature	T _A	0		70	°C
Maximum Supply Voltage	V _{CC}	-0.5		4	V
Relative Humidity	RH	0		85	%

Electrical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Supply Voltage	V _{CC}	3.135		3.465	V	
Supply Current	I _{CC}			515	mA	
Power Consumption	P			1.7	W	

Transmitter Section:

Input differential impedance	R _{in}		100		Ω	1
Differential input voltage swing	V _{in,pp}	100		1000	mV	
Transmit Disable Voltage	V _D	2		V _{CC}	V	
Transmit Enable Voltage	V _{EN}	V _{EE}		V _{EE} +0.8	V	

Receiver Section:

Differential output voltage swing	V _O	120		800	mV	
LOS Fault	V _{LOS fault}	2		V _{CC} H _{OST}	V	2
LOS Normal	V _{LOS norm}	V _{EE}		V _{EE} +0.8	V	2

Note:

1. Connected directly to TX data input pins. AC coupling from pins into laser driver IC.
2. LOS is an open collector output. Should be pulled up with 4.7k – 10kΩ on the host board. Normal operation is logic 0; loss of signal is logic 1.

Optical Parameters

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Transmitter Section:						
Center Wavelength	λ _t	1530	1550	1565	nm	
Spectral width	Δλ			0.4	nm	
Side Mode Suppression Ratio	SMSR	30			dBm	
Average Optical Power	P _{avg}	0		+5	dBm	
Laser Off Power	P _{off}			-30	dBm	
Extinction Ratio	ER	6			dB	
Transmitter Dispersion Penalty	TDP			3.0	dB	

Receiver Section:

Center Wavelength	λ _r	1260		1620	nm	
Receiver Sensitivity	Sen			-23	dBm	1
Input Saturation Power(Overload)	P _{sat}	-7			dBm	
Los Assert	LOSA	-35		-	dBm	
Los Dessert	LOSD			-24	dBm	
Los Hysteresis	LOSH	0.5			dB	

Note:

1. Measured with a PRBS 2³¹-1 test pattern, @10.3125Gb/s, BER<10⁻¹², back to back.

Pin Assignment

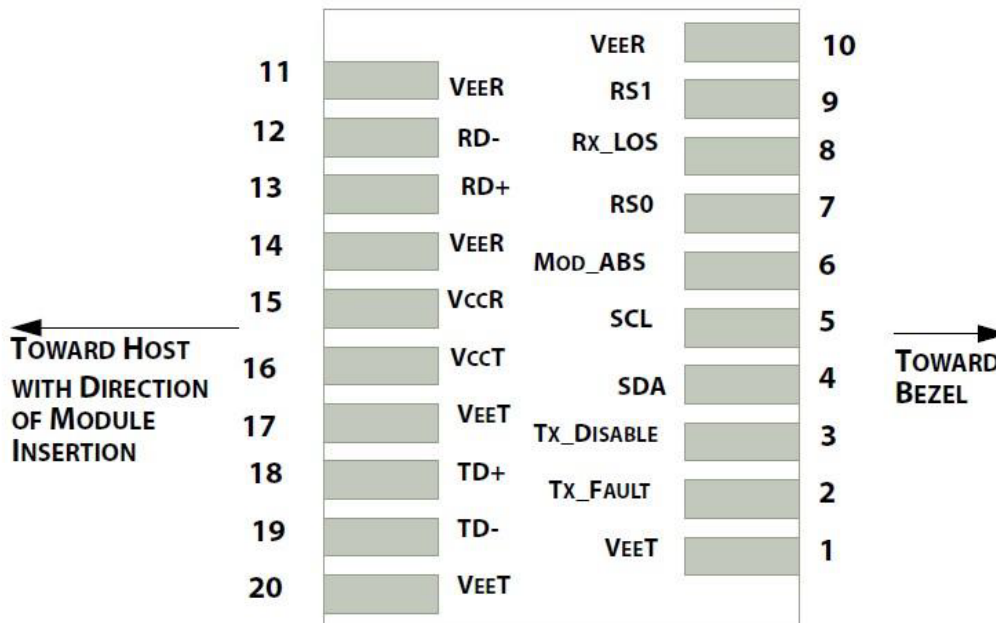


Diagram of Host Board Connector Block Pin Numbers and Names

Pin Function Definitions

PIN #	Symbol	Function	Notes
1	VeeT	Module transmitter ground	1
2	Tx Fault	Module transmitter fault	2
3	Tx Disable	Transmitter Disable; Turns off transmitter laser output	3
4	SDA	2 wire serial interface data input/output (SDA)	
5	SCL	2 wire serial interface clock input (SCL)	
6	MOD-ABS	Module Absent, connect to VeeR or VeeT in the module	2
7	RS0	Rate Select 0. Not Used	
8	LOS	Receiver Loss of Signal Indication	4
9	RS1	Rate Select 1. Not Used	
10	VeeR	Module receiver ground	1
11	VeeR	Module receiver ground	1
12	RD-	Receiver inverted data out put	
13	RD+	Receiver non-inverted data out put	
14	VeeR	Module receiver ground	1
15	VccR	Module receiver 3.3V supply	
16	VccT	Module transmitter 3.3V supply	
17	VeeT	Module transmitter ground	1
18	TD+	Transmitter non-inverted data out put	
19	TD-	Transmitter inverted data out put	
20	VeeT	Module transmitter ground	1

Note:

- 1.The module ground pins shall be isolated from the module case.
- 2.This pin is an open collector/drain output pin and shall be pulled up with 4.7K-10Kohms to Host_Vcc on the host board.
- 3.This pin shall be pulled up with 4.7K-10Kohms to VccT in the module.
- 4.This pin is an open collector/drain output pin and shall be pulled up with 4.7K-10Kohms to Host_Vcc on the host board.

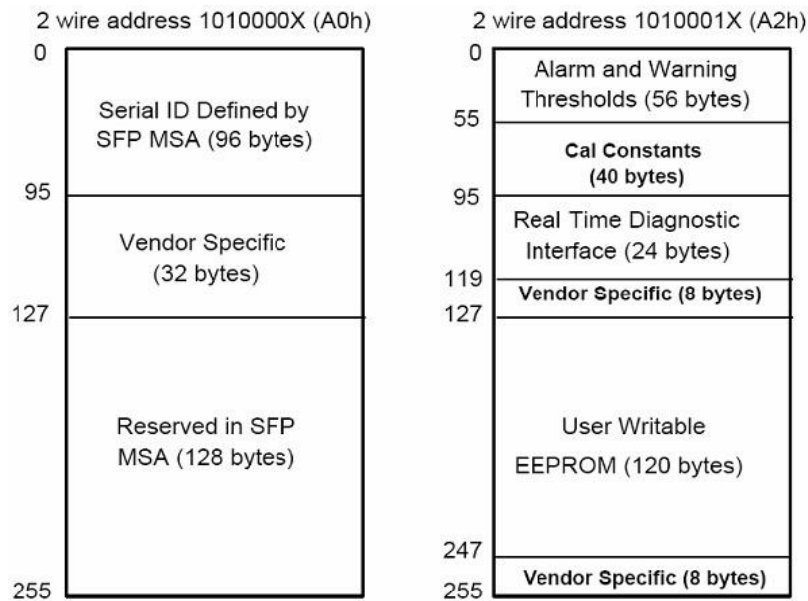
SFP Module EEPROM Information and Management

The SFP modules implement the 2-wire serial communication protocol as defined in the SFF -8472. The serial ID information of the SFP modules and Digital Diagnostic Monitor parameters can be accessed through the I²C interface at address A0h and A2h.

The memory is mapped in Table 1.

For more details of the memory map and byte definitions, please refer to the SFF-8472, “Digital Diagnostic Monitoring Interface for Optical Transceivers”. The DDM parameters have been internally calibrated.

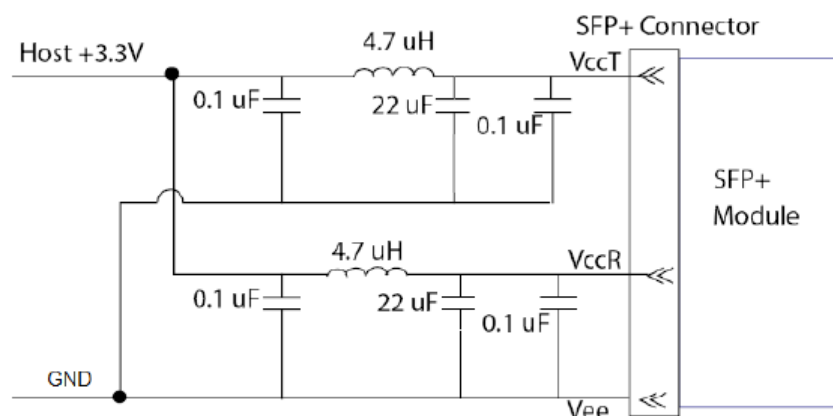
Table 1. Digital Diagnostic Memory Map (Specific Data Field Descriptions)



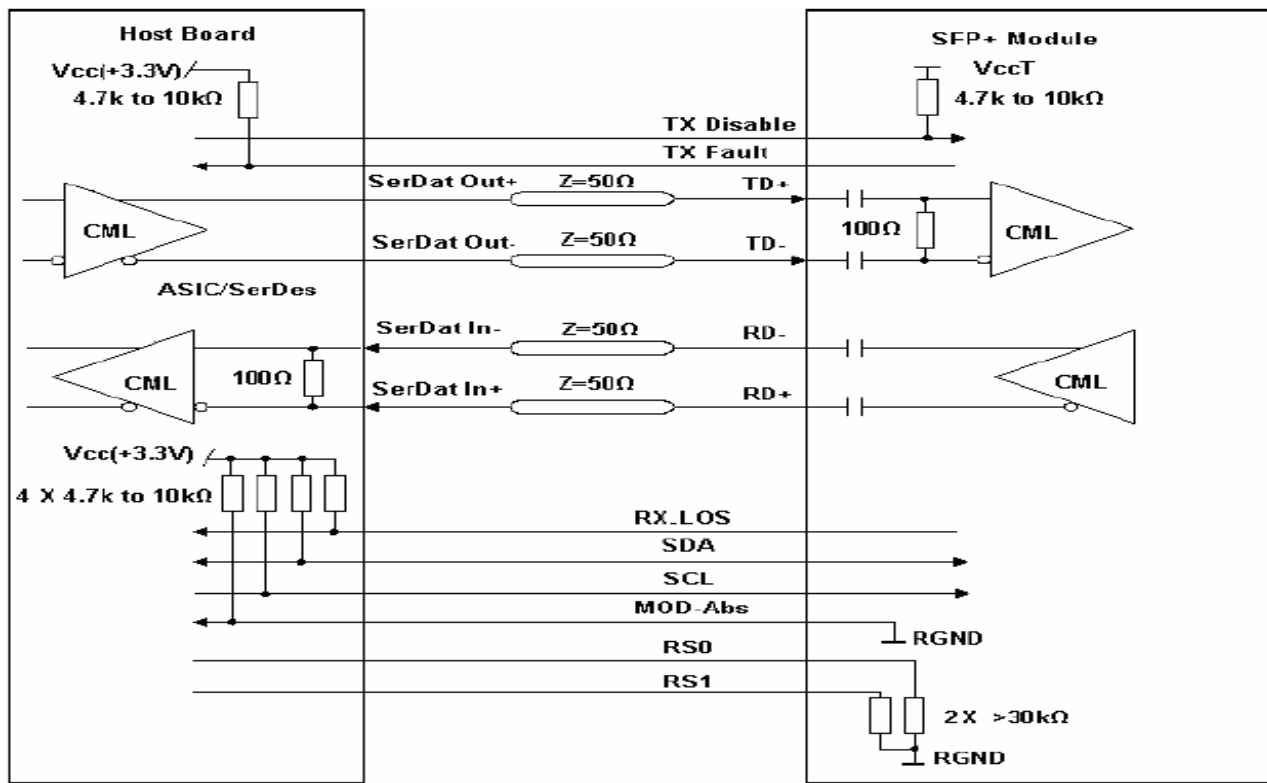
Digital Diagnostic Monitor Characteristics

Data Address	Parameter	Accuracy	Unit
96-97	Transceiver Internal Temperature	±3.0	°C
98-99	VCC3 Internal Supply Voltage	±3.0	%
100-101	Laser Bias Current	±10	%
102-103	Tx Output Power	±3.0	dB
104-105	Rx Input Power	±3.0	dB

Recommended Circuit



Recommended Host Board Power Supply Circuit



Recommended High-speed Interface Circuit

Mechanical Dimensions(Unit:mm)

