



OX-SFP-SS-20

Features

- ◆ Types available:
1310nm Laser and PIN Photo-Detector
1490nm Laser and PIN Photo-Detector
1550nm Laser and PIN Photo-Detector
- ◆ 20km distance over SMF at least
- ◆ Build-in PHY supporting SGMII Interface
- ◆ Support More Link Status Monitor, Such as
CRC, Package Counter and Far End Fault
- ◆ Indication(FEFI)
- ◆ Single 3.3V Power Supply and TTL Logic
Interface
- ◆ Compliant with SFP MSA package with duplex
LC Connector
- ◆ Standard Serial ID information Compliant with
SFP MSA
- ◆ Operating Case Temperature
Standard: 0C~+70C
Industrial: -40C~+85C



Applications

- ◆ 100BASE-FX
- ◆ Switched Backplane Applications
- ◆ Switch to Switch Interface
- ◆ Other Optical Transmission System

Standards

- ◆ Compliant with SFP MSA (INF-8074i)
- ◆ ESD MIL-STD-883E Method 3015.7
- ◆ Compatible with SFF-8472
- ◆ Compliant with ITU-T G.957 STM-1
- ◆ FCC Part 15 Class B, UL, FDA and RoHS

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	Ts	-40	+85	°C
Relative Humidity	RH	5	95	%
Supply Voltage	Vcc	-0.5	4.0	V



Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit
Operating Case Temperature	T _A	0		+70	°C
Power Supply Voltage	V _{cc}	3.15	3.3	3.45	V
Power Supply Current	I _{cc}			300	mA
Surge Current	I _{surge}			+30	mA
Baud Rate			155		GBaud

Specifications-Electrical

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
TRANSMITTER						
LVPECL Inputs(Differential)	V _{in}	400		2500	mVp	AC coupled inputs
Input Impedance (Differential)	Z _{in}	85	100	115	ohms	R _{in} > 100 kohms @ DC
Tx_DISABLE Input Voltage - High		2		3.45	V	
Tx_DISABLE Input Voltage - Low		0		0.8	V	
Tx_FAULT Output Voltage -- High		2		V _{cc} +0.3	V	I _o = 400μA; Host V _{cc}
Tx_FAULT Output Voltage -- Low		0		0.5	V	I _o = -4.0mA
RECEIVER						
LVPECL Outputs (Differential)	V _{out}	400	800	1200	mVpp	AC coupled outputs
Output Impedance (Differential)	Z _{out}	85	100	115	ohms	
Rx_LOS Output Voltage - High		2		V _{cc} +0.3	V	I _o = 400μA; Host V _{cc}
Rx_LOS Output Voltage - Low		0		0.8	V	I _o = -4.0mA
MOD_DEF (0:2)	VoH	2.5			V	With Serial ID
	VoL	0		0.5	V	



Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit
9μm Core Diameter SMF for OST-SFP-DR-100LX			10		Km
Data Rate			125		Mbps
Transmitter					
Centre Wavelength	λ_c	1260	1310	1360	nm
Spectral Width (RMS) for OST-SFP-DR-100LX	σ			7.7	nm
Average Output Power for OST-SFP-DR-100LX	P _{out}	-15		-8	dBm
Extinction Ratio for OST-SFP-DR-100LX	EX	8.2			dB
Rise/Fall Time(20%~~80%)	tr/tf			2	ns
Total Jitter	TJ			56.5	ps
Output Optical Eye		IUT-T G.957 Compliant			
Data Input Swing Differential	V _{in}	500		2000	mV
Input Differential Impedance	Z _{in}	90	100	110	Ω
TX Disable	Disable	2.0		VCC+0.3	V
	Enable	0		0.8	
TX_Fault	Fault	2.0		VCC+0.3	V
	Normal	0		0.8	
TX_Disable Assert Time	t _{off}			10	us
Receiver					
Centre Wavelength	λ_c	1100		1600	nm
Receiver Sensitivity for OST-SFP-DR-100LX	Se			-32	dBm
Output Differential Impedance	P _{in}	90	100	110	Ω
Data Output Swing Differential	V _{out}	370		2000	mV
Rise/Fall Time	Tr/tf			2.2	ns
LOS De-AssertS	LOS _D			-35	dBm
LOS Assert	LOS _A	-40			dBm
LOS	High	2.0		VCC+0.3	V
	LOW	0		0.8	

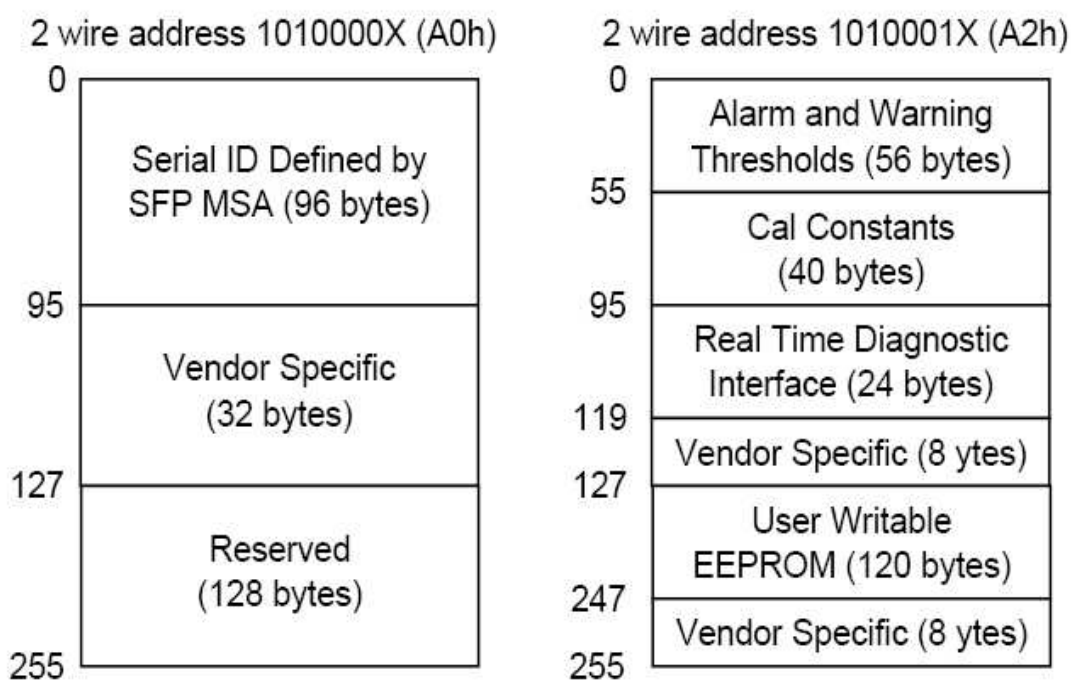
EEPROM Serial ID Memory Contents

The serial interface uses the 2-wire serial CMOS EEPROM protocol defined for the ATMEL AT24C02/04 family of components.



When the serial protocol is activated, the host generates the serial clock signal (SCL). The positive edge clocks data into those segments of the EEPROM that are not write protected within the SFP transceiver. The negative edge clocks data from the SFP transceiver. The serial data signal (SDA) is bi-directional for serial data transfer. The host uses SDA in conjunction with SCL to mark the start and end of serial protocol activation. The memories are organized as a series of 8-bit data words that can be addressed individually or sequentially.

The Module provides diagnostic information about the present operating conditions. The transceiver generates this diagnostic data by digitization of internal analog signals. Calibration and alarm/warning threshold data is written during device manufacture. Received power monitoring, transmitted power monitoring, bias current monitoring, supply voltage monitoring and temperature monitoring all are implemented. The diagnostic data are raw A/D values and must be converted to real world units using calibration constants stored in EEPROM locations 56 – 95 at wire serial bus address A2h. The digital diagnostic memory map specific data field define as following. For detail EEPROM information, please refer to the related document of SFF 8472 Rev 9.3.



EEPROM Serial ID Memory Contents

Accessing Serial ID Memory uses the 2 wire address 1010000X(A0). Memory Contents of Serial ID are shown in Table 2.

Table 2 Serial ID Memory Contents

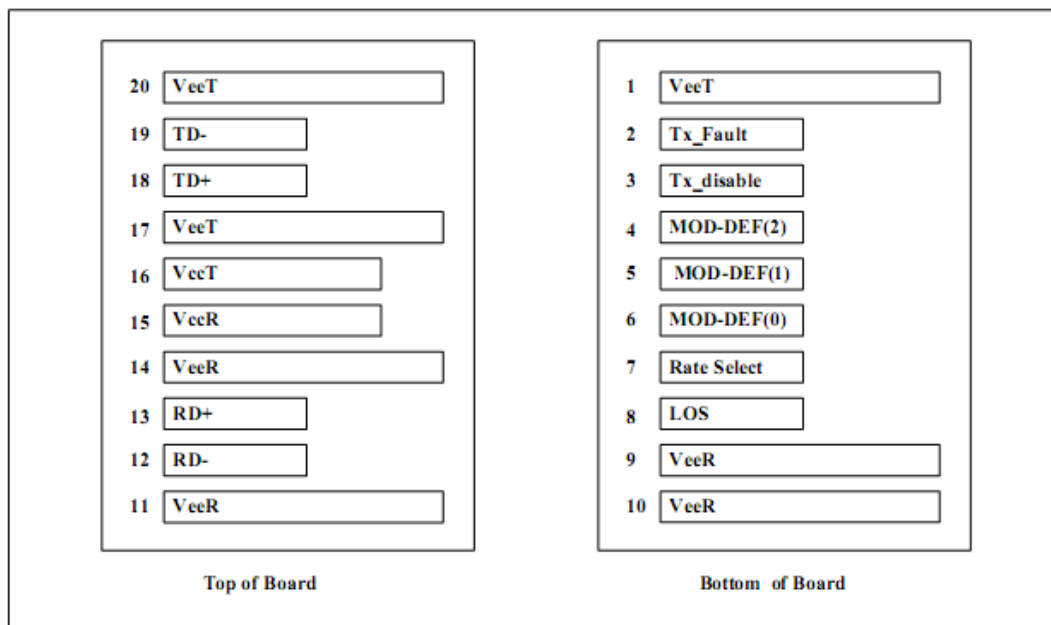
Data Address	Size (Bytes)	Name of Field	Contents(Hex)	Description
BASE ID FIELDS				



0	1	Identifier	03	SFP
1	1	Ext. Identifier	04	SFP function is defined by serial ID only
2	1	Connector	07	LC Connector
3-10	8	Transceiver		Transceiver Codes
11	1	Encoding	03	NRZ
12	1	BR, Nominal	02	155Mbit/s
13	1	Reserved	00	
14	1	Length(9μm)km	14	
15	1	Length (9μm) 100m	C8	
16	1	Length (50μm) 10m	00	
17	1	Length(62.5μm)10m	00	
18	1	Length (Copper)	00	Not compliant
19	1	Reserved	00	
20-35	16	Vendor name	4F 75 73 65 6E 74 20 20 20 20 20 20 20 20 20 20	“Ousent”(ASCII)
36	1	Reserved	00	
37-39	3	Vendor OUI	00 00 00	
40-55	16	Vendor PN		Transceiver part number
56-59	4	Vendor rev	20 20 20 20	
60-61	2	Wavelength	05 1E	Transceiver wavelength
62	1	Reserved	00	
63	1	CC_BASE	Checksum(Variable)	Check code for Base ID Fields
EXTENDED ID FIELDS				
64-65	2	Options	00 1A	TX_DISABLE, X_FAULT and Loss of Signal mplemented.
66	1	BR,max	00	
67	1	BR,min	00	
68-83	16	Vendor SN	42 30 39 38 32 32 20 20 20 20 20 20 20 20 20 20	Serial Number of transceiver (ASCII).ForexampleB009822”.
84-91	8	Date code	30 32 31 30 30 35 20 20	Manufactory date code. For example “021005”.
92-94	3	Reserved	00 00 00	
95	1	CC_EXT	Checksum(Variable)	Check sum for Extended ID Field.
VENDOR SPECIFIC ID FIELDS				
96-127	32	Vendor Specific	Read only	Depends on customer information
128-155	128	Reserved	Read only	Filled by zero

SFP Transceiver Electrical Pad Layout

Pin Description



As Viewed Through Top of Board

Pin	Name	Function/Description	Engagementorder	Notes
1	VeeT	Transmitter Ground	1	
2	TX Fault	Transmitter Fault Indication	3	1
3	TXDisable	Transmitter Disable-Module disables on high or open	3	2
4	MOD-DEF2	Module Definition 2-Two wire serial ID interface	3	3
5	MOD-DEF1	Module Definition 1-Two wire serial ID interface	3	3
6	MOD-DEF0	Module Definition 0-Two wire serial ID interface	3	3
7	Rate Select	Not Connected	3	
8	LOS	Loss of Signal	3	4
9	VeeR	Receiver Ground	1	
10	VeeR	Receiver Ground	1	
11	Veer	Receiver Ground	1	
12	RD-	Inverse Received Data out	3	5
13	RD+	Received Data out	3	5
14	VeeR	Receiver Ground	1	
15	VccR	Receiver Power — +3.3V±5%	2	6
16	VccT	Transmitter Power — +3.3 V±5%	2	6
17	VeeT	Transmitter Ground	1	
18	TD+	Transmitter Data In	3	7
19	TD-	Inverse Transmitter Data In	3	7
20	VeeT	Transmitter Ground	1	

Note1. TX Fault is open collector/drain output which should be pulled up externally with a 4.7K – 10KΩ resistor on the host board to supply <VccT+0.3V or VccR+0.3V. When high, this output indicates a laser fault of some kind. Low indicates normal operation.



In the low state, the output will be pulled to $<0.8V$.

Note2. TX Disable input is used to shut down the laser output per the state table below. It is pulled up within the module with a $4.7 - 20K$ resistor. Low ($0 - 0.8V$): Transmitter on Between ($0.8V$ and $2V$): Undefined High ($2.0 - V_{ccT}$): Transmitter Disabled Open : Transmitter Disabled

Note3. Mod-Def 0, 1, 2. These are the module definition pins. They should be pulled up with a $4.7 - 10K$ resistor on the host board to supply less than $V_{ccT}+0.3V$ or $V_{ccR}+0.3V$. Mod-Def 0 is grounded by the module to indicate that the module is present. Mod-Def 1 is clock line of two wire serial interface for optional serial ID. Mod-Def 2 is data line of two wire serial interface for optional serial ID.

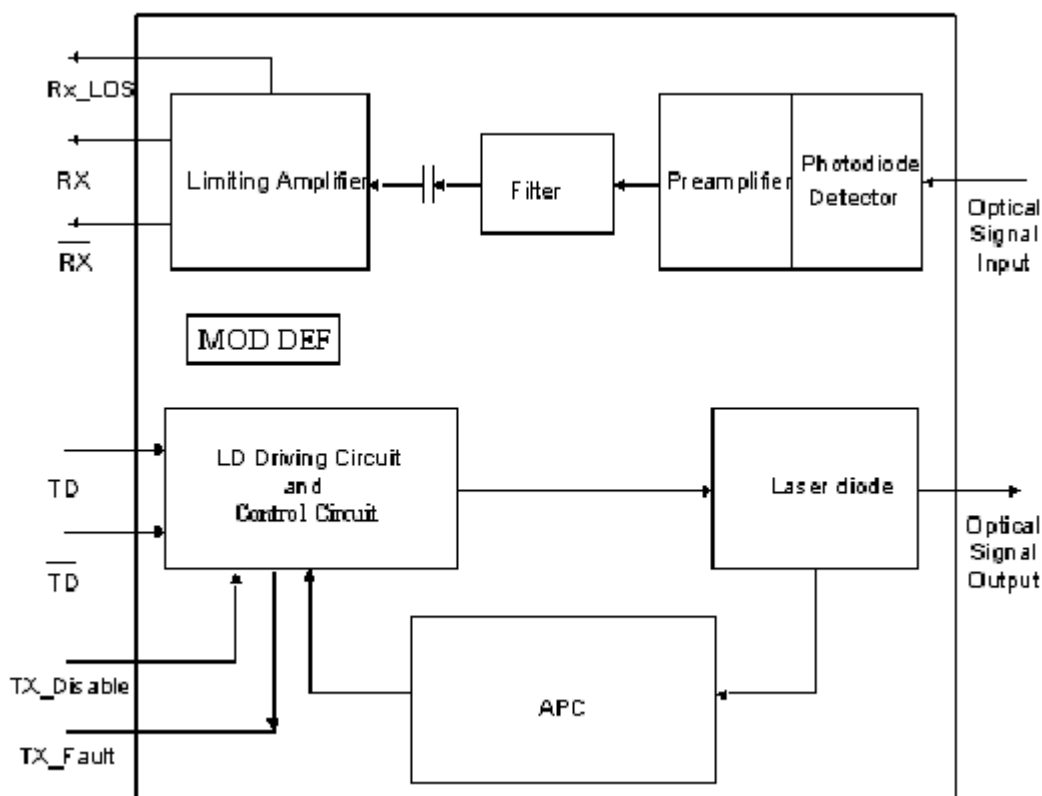
Note4. LOS (Loss of signal) is an open collector/drain output which should be pulled up externally with a $4.7 - 10K$ resistor on the host board to supply $<V_{ccT}+0.3V$ or $V_{ccR}+0.3V$. When high, this output indicates the received optical power is below the worst case receiver sensitivity (as defined by the standard in use). Low indicates normal operation. In the low state, the output will be pulled to $<0.8V$.

Note5. RD-/+ : These are the differential receiver outputs. They are AC coupled 100Ω differential lines which should be terminated with 100Ω differential at the user SERDES. The AC coupling is done inside the module and thus not required on the host board.

Note6. V_{ccR} and V_{ccT} are the receiver and transmitter power supplies. They are defined as $3.3V \pm 5\%$ at the SFP connector pin. The in-rush current will typically be no more than $30mA$ above steady state supply current after $500ns$.

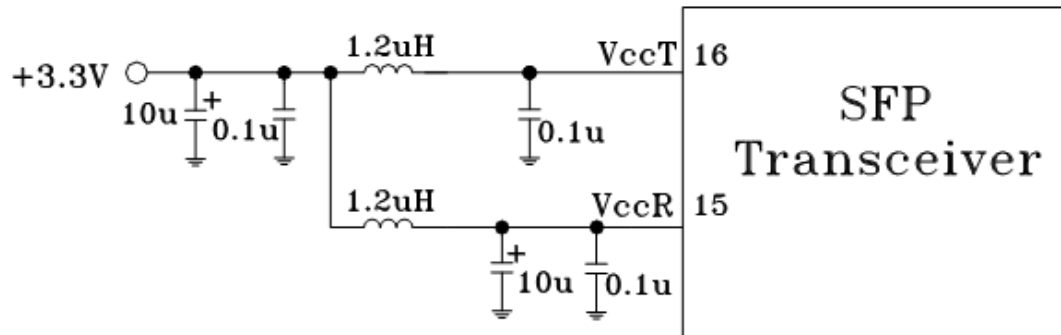
Note7. TD-/+ : These are the differential transmitter inputs. They are AC coupled differential lines with 100Ω differential termination inside the module. The AC coupling is done inside the module and is thus not required on host board.

Block Diagram

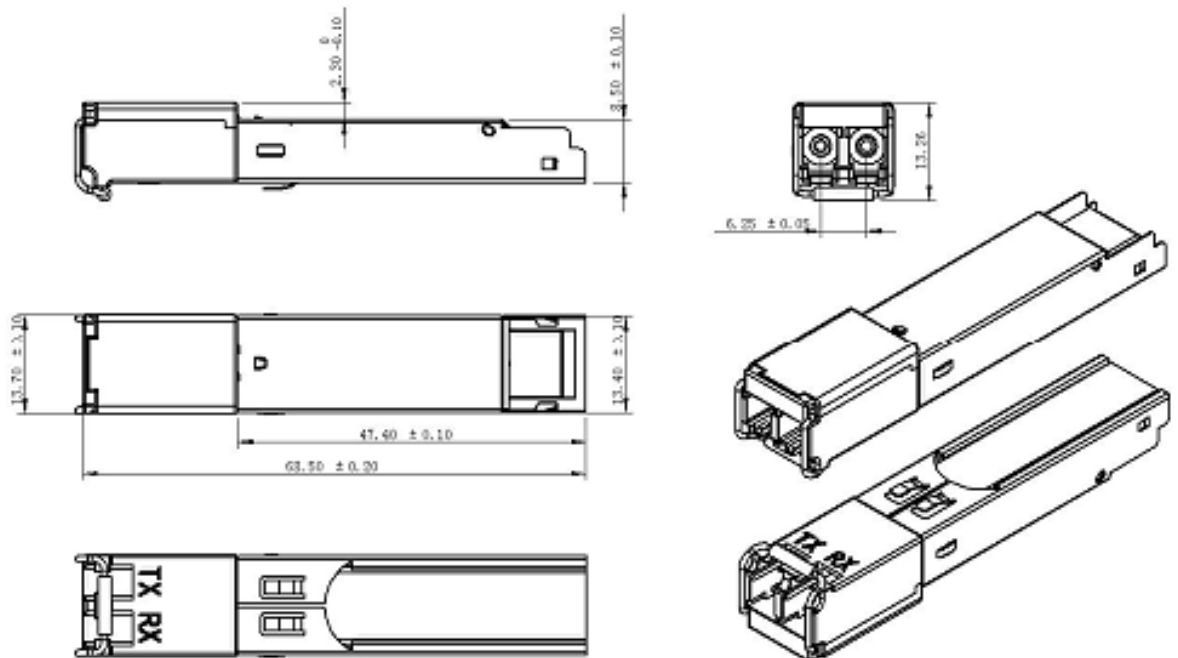




Required Host Board Components



Package Outline





Ordering information of LC BIDI SFP

Part No.	Data Rate	Laser	Fiber Type	Distance	Optical Interface	Industry Temperatur	DDM	Application
OX1315-20	155Mbps	1310nm	SMF	20km	LC		NO	FE
OX1315-20	155Mbps	1310nm	SMF	20km	LC	YES	NO	FE

* D--- DDMI, I---Industry temperature

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