

GEPON OLT PX20+ SFP Transceiver
PES12-B4320**Features**

- Single fiber bi-directional data links symmetric 1.25Gb/s application
- SFP metallic package with SC/UPC Receptacle connector
- Single 3.3V power supply
- 1490nm continuous-mode DFB laser transmitter
- 1310nm Burst-mode APD/TIA receiver
- LVPECL compatible data input/output interface
- LVTTL transmitter disable control
- Burst Digital Receiving Signal Strength Indication (RSSI)
- 0 to 70°C for commercial Case Operating Temperature Range
- 40 to 85°C for industrial Case Operating Temperature Range
- Digital diagnostic monitor interface compatible with SFF-8472
- Low EMI and excellent ESD protection
- Class 1 Laser eye safety standard
- RoHS-6 compliance

Applications

Optical transceiver for PX20+ of Gigabit Ethernet Passive Optical Networks (GEPON) OLT side

Standards

- Complies with SFP Multi-Source Agreement (MSA) SFF-8074i
- Complies with IEEE802.3ah 1000BASE-PX20+
- Complies with SFF 8472 V9.5
- Complies with FCC 47 CFR Part 15, Class B
- Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007

Description

The PES12-B4320(l) transceivers provide 1490nm continuous-mode transmitter and 1310nm burst-mode receiver for PX20+ of Gigabit Ethernet Passive Optical Network (GEPON) applications. The optical interface is SC/UPC Receptacle. It adopts Small Form-factor Pluggable (SFP) Package. Power supply is single +3.3V Voltage.

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min	Max	Units	Notes
Storage Temperature	T_{stg}	-40	+85	°C	Exceeding the Absolute Maximum Ratings may cause irreversible damage to the device. The device is not intended to be operated under the condition of simultaneous Absolute Maximum Ratings, a condition which may cause irreversible damage to the device.
Commercial Case Operating Temperature Range	T_{case}	0	+70	°C	
Industrial Case Operating Temperature Range		-40	+85	°C	
DC Supply Voltage	V_{CC}	0	4.2	V	
Relative Humidity - Operating	RH_o	5	95	%	
Receiver Damaged Threshold		0		dBm	

RECOMMENDED OPERATING CONDITION

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Operating Case Temperature	T_c	0		70	°C	Commercial
		-40		85	°C	Industrial
Power Supply Voltage	V_{CC}	3.13	3.3	3.47	V	
Power Supply Current				450	mA	
Operating Relative Humidity		5		95	%	
Data Rate(TX/RX)			1.25		Gb/s	
Data Rate Drift		-100		+100	PPM	

TRANSMITTER ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Tx_Data Differential Input Voltage	$V_{IH}-V_{IL}$	200		1600	mV	LVPECL, AC coupled
Input Differential Impedance	R_{in}	90	100	110	Ω	
Transmitter Disable control Voltage - Low	V_{IL}	0		0.8	V	LVTTTL
Transmitter Disable control Voltage - High	V_{IH}	2.0		V_{CC}	V	
TX_Fault indicate voltage - Low	V_{OL}	0		0.4	V	
TX_Fault indicate voltage - High	V_{OH}	2.4		V_{CC}	V	

RECEIVER ELECTRICAL CHARACTERISTICS

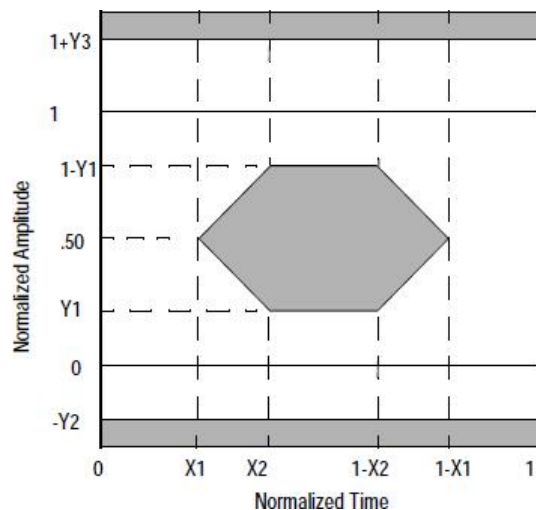
Parameter	Symbol	Min	Typ	Max	Unit	Notes
Rx_Data Differential Output Voltage	$V_{IH}-V_{IL}$	400		1600	mV	
Los Assert Time				500	ns	
Los Deassert Time				500	ns	
Loss Of Signal indicate voltage - Low	V_{OL}	0		0.4	V	LVTTTL
Loss Of Signal indicate voltage - High	V_{OH}	2.4		V_{CC}	V	

I2C SERIAL LOGIC						
Parameter	Symbol	State	Min	Typ	Max	Unit
I ² C Serial Data	SDA _H	HIGH	2.0		V _{cc}	V
	SDA _L	LOW	0		0.8	V
I ² C Serial Clock	SCL _H	HIGH	2.0		V _{cc}	V
	SCL _L	LOW	0		0.8	V

Transmitter Optical Specification						
Parameter	Symbol	Min	Typ	Max	Unit	Notes
Transmitter Type		1490nm DFB Continuous Mode				
Data Rate	Stx		1.25		Gb/s	
Centre Wavelength	λ_c	1480	1490	1500	nm	
Spectral Width (-20dB)	$\Delta\lambda$			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Mean Launched Power	P _{out}	2.5		7	dBm	
Mean Launched Power (TX Off)	P _{out}			-39	dBm	
Extinction Ratio	ER	9			dB	Note 1
TX Total Jitter	TJ			0.43	UI	
Rise/Fall Time	TR/TF			260	ps	20%-80%
RIN _{15OMA}				-115	dB/Hz	
Optical Return Loss Tolerance				12	dB	
Transmitter dispersion Penalty	TDP			2.3	dB	Transmit on 20km SMF
Eye Diagram		Compliant With IEEE Std 802.3ah™-2004				Note 2

Note 1: Measured with PRBS 27-1 test pattern @1.25Gb/s, Low Pass Filter is on.

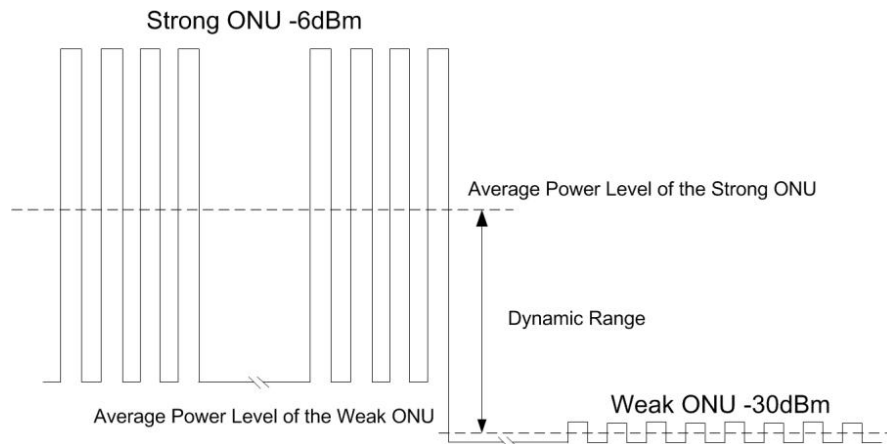
Note 2: Transmitter eye mask definition



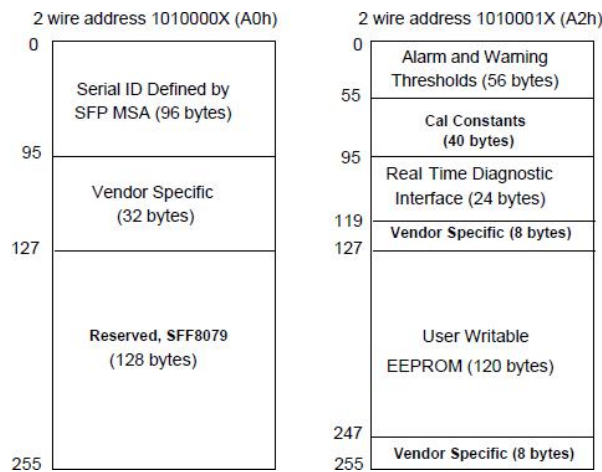
Receiver Optical Specifications						
Parameter	Symbol	Min	Typ	Max	Unit	Notes
Receiver Type		1310nm Burst-mode APD/TIA				
Data Rate	Stx		1.25		Gb/s	
Receive Wavelength	λ_c	1260	1310	1360	nm	
Sensitivity	SEN			-30	dBm	Note 1
Overload	SAT	-6			dBm	
Receiver Threshold Settling Time				250	ns	
RX Dynamic Range		-30		-6	dBm	Note 2
LOS-Deassert				-31	dBm	
LOS-Assert		-45			dBm	
SD Hysteresis		0.5		6	dB	
Receiver Reflectance				-12	dB	

Note 1: Measured with a PRBS 27-1 test pattern @1.25Gbps and ER=10dB, BER <=10⁻¹²

Note 2: RX Dynamic Range Definition



EEPROM INFORMATION



PES12-B4310-20(I) I2C Memory Map (Page A0 HEX, Unlisted Fields are Blank / Empty)					
Address		Memory Contents		Description	Name of Field
Decimal	HEX	HEX			
0	00	03		SFP transceiver	Identifier
1	01	04		MOD4	Extended Identifier
2	02	01		SC	Connector Values
6	06	80		BASE-PX	Transceiver Codes
11	0B	01		8B10B	Encoding Codes
12	0C	0D		1.25G	Nominal Bit Rate
14	0E	14		20(km)	9 micron fiber length
15	0F	C8		200(100m)	9 micron fiber length
20 to 35	14 to 23	XX		Vendor Name	"PRIMUS IT"
40 to 48	28 to 30	XX		Vendor Part Number	"PES12-B4310-20(I)"
56 to 59	37 to 3B	01		Vendor Revision Number	Revision 1.0
60 to 61	3C to 3E	05 D2		Wavelength = 1490 nm	Laser Wavelength
65	41	1A		LOS,TX_FAULT and TX_DISABLE	Option Values
68 to 83	44 to 53	XX		Vendor Serial Number	Serial Number
84 to 91	54 to 5B	XX		Vendor Date Code	Date Code
92	5C	58		Type of Diagnostics	Average Power, External Calibration, 8472 DDMI
93	5D	F0		Enhanced Options	Optional Alarm/warning Flags Implemented; RX_LOS;TX_FAULT;TX_DISABLE Implemented
94	5E	02		8472 Compatibility	Rev 9.5 of SFF-8472.

SFF-8472 Rev 9.4 A2 (HEX) Address Table for Alarm and Warning Data														
8472 Parameter	Alarm Threshold Data				Warning Threshold Data				Measured Values		Alarm Bit		Warning Bit	
	High Value		Low Value		High Value		Low Value				Address + Position		Address + Position	
	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	HIGH	Low	HIGH	Low
Temperature	00	01	02	03	04	05	06	07	96	97	112 (7)	112 (6)	116 (7)	116 (6)
Vcc	08	09	10	11	12	13	14	15	98	99	112 (5)	112 (4)	116 (5)	116 (4)
TX Bias	16	17	18	19	20	21	22	23	100	101	112 (3)	112 (2)	116 (3)	116 (2)
TX Power	24	25	26	27	28	29	30	31	102	103	112 (1)	112 (0)	116 (1)	116 (0)
RX Power	32	33	34	35	36	37	38	39	104	105	113 (7)	113 (6)	117 (7)	117 (6)

DIGITAL DIAGNOSTIC MONITORING INTERFACE			
Parameter	Range	Accuracy	Calibration
Temperature	-40 to 85°C	±3°C	Internal
Voltage	2.9 to 3.6V	±3%	Internal
Bias Current	0 to 100mA	±10%	Internal
TX Power	2.5 to 7dBm	±3dB	Internal
RX Power monitor	-30 to -6dBm	±3dB	External

PES12-B4310-20 PIN ASSIGNMENT				
Pin	Name	Level/Logic	Function	Description
1	GNDT	NA	Ground	Transmitter Ground
2	TX_Fault	LVTTTL	TX Fault	TX Fault Alarm, TX Fault State: High; TX Normal State: Low
3	TX_Dis	LVTTTL	Transmitter Enable/Disable	Active High
4	MOD-DEF2	LVTTTL	SDA	I2C data
5	MOD-DEF1	LVTTTL	SCL	I2C clock
6	MOD-DEF0	MOD-DEF0		Module Definition 0, Grounding in SFP
7	RSSI_Trig	LVTTTL	RSSI Trigger	Active High for Sampling
8	LOS	LVTTTL	RX Loss of Signal	Note 1
9	GNDR	NA	Ground	Receiver Ground
10	GNDR	NA	Ground	Receiver Ground
11	GNDR	NA	Ground	Receiver Ground
12	RD-	LVPECL	Rx Data-	Inv. RX data output, DC coupled output
13	RD+	LVPECL	Rx Data+	RX data output, DC coupled output
14	GNDR	NA	Ground	Receiver Ground
15	V _{cc} R	NA	Receiver Power Supply	Rx Power
16	V _{cc} T	NA	Transmitter Power Supply	Tx Power
17	GNDT	GNDT	Ground	Transmitter Ground
18	TD+	LVPECL	Tx Data+	TX data input, internally AC coupled with 100ohm terminated
19	TD-	LVPECL	Tx Data-	Inv. TX data input, internally AC coupled with 100ohm terminated
20	GNDT	NA	Ground	Transmitter Ground

Note1: LOS (Loss of Signal) is an open collector/drain output which should be pulled up externally with a 4.7k-10k resistor on the host board to supply V_{cc}T or V_{cc}R. High indicates the received optical power is below the worst case receiver sensitivity. Low indicates normal operation.

PIN OUT DRAWING

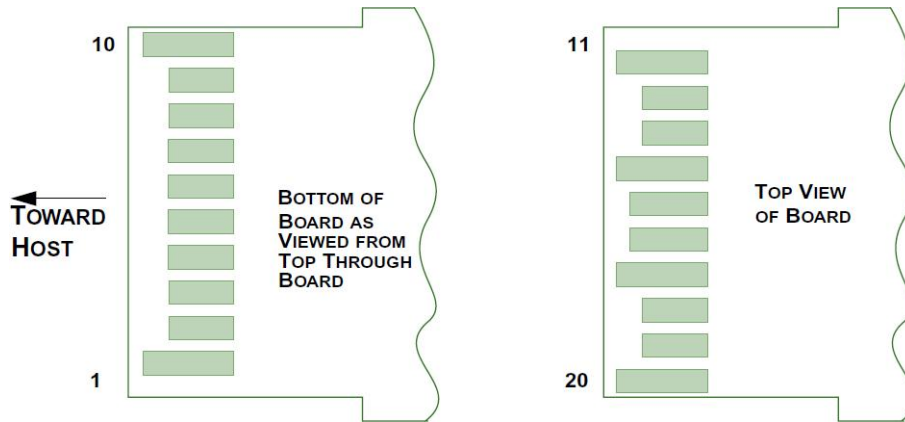


Figure 1 Pin Out Drawing (Top view)

Mechanical Specifications (Unit: mm)

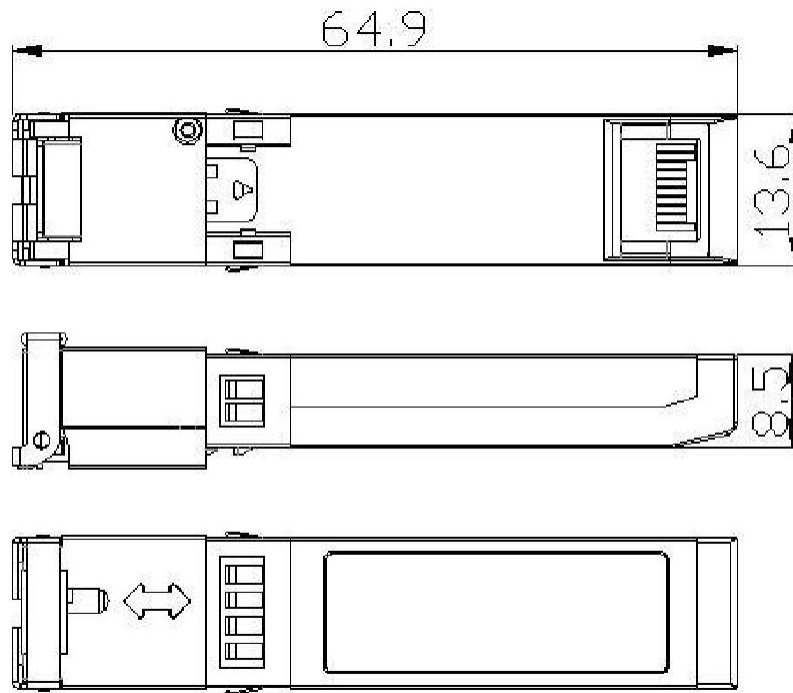


Figure 2 Mechanical Outline Drawing

Recommended Interface Circuit

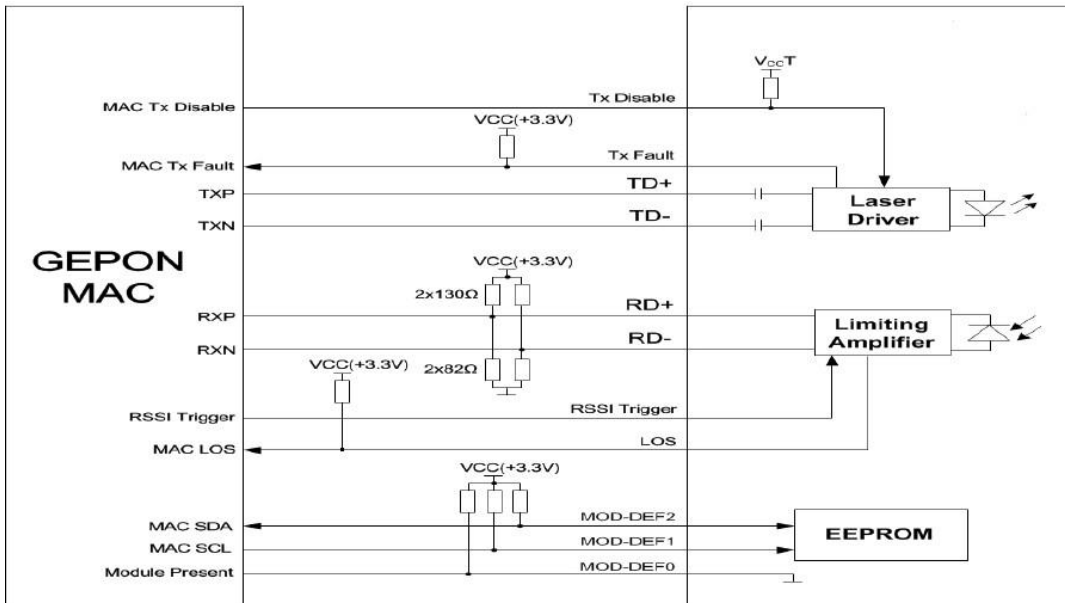


Figure 3 Recommended Interface Circuit

RSSI Trigger Time Sequence

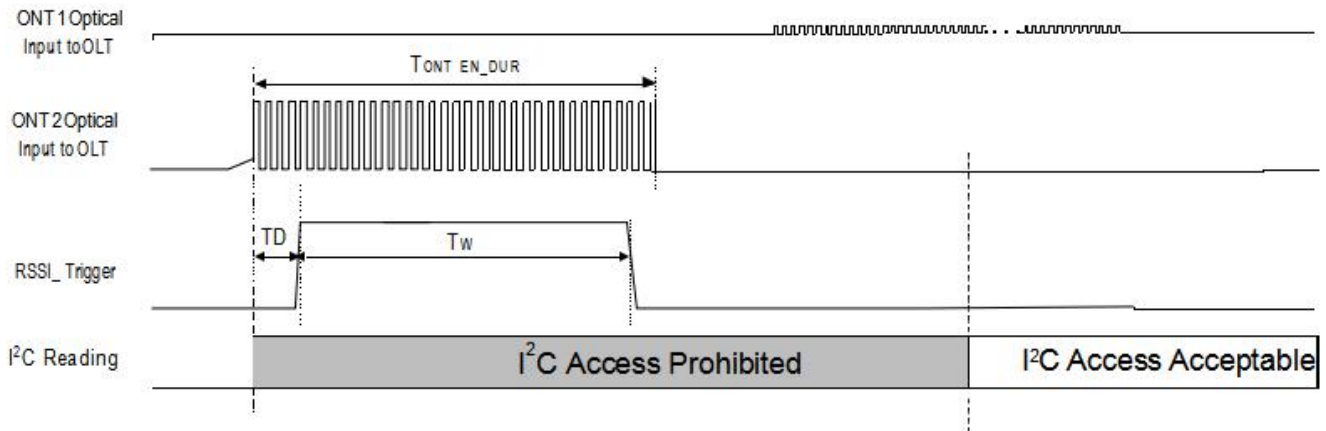


Figure 4 RSSI Timing Diagram

Item	Symbol	Min	Typ	Max	unit
Optical input signal length for RSSI	T_{ONT}	1.2			us
Trigger delay	T_D		512		ns
Trigger width	T_W	600		$T_{ONT}-T_D$	ns
I2C read guard time	T_P			500	us

Order Information

Part Number	Product Description
PES12-B4320	GEPON OLT PX20+, 20km, Tx 1490nm 1.25G, Rx 1310nm 1.25G, AOP 2.5~7dBm, SFP form-factor, SC/UPC receptacle connector, 0~70°C
PES12-B4320-I	GEPON OLT PX20+, 20km, Tx 1490nm 1.25G, Rx 1310nm 1.25G, AOP 2.5~7dBm, SFP form-factor, SC/UPC receptacle connector, -40~85°C

Contact Information

PRIMUS IT LIMITED

- 1、 HongKong: RM M4/F Continental Mansion 300 King's RD HK
- 2、 Tel:+86 0755-25924025
- 3、 Fax:+86 0755-25924051
- 4、 Website: <http://www.primus-it.com>
- 5、 Email: sales@primus-it.com