

FOCUS-1312-XX 1310nm Single-mode GBIC

Features

- Compliant with Gigabit Interface Converter (GBIC) Revision 5.5
- Compliant with proposed specifications for IEEE 802.3z/Gigabit Ethernet
- Up to 1.25Gb/s bi-directional data link
- 1310nm FP laser for 10Km and 20 Km transmission
- 1310nm uncooled DFB laser for 40Km transmission
- Extended power supply +3.3/5.0V compatible
- Hot Pluggable
- Low EMI
- Low power dissipation
- Class 1 Laser Product Compliant with the Requirements of IEC 60825-1 and IEC 60825-2

Applications

- ◆ Switch to switch interface
- ◆ High speed I/O for file servers

◆ Bus extension applications

Product Description

Eoptolink's FOCUS-1312-XX is a high performance integrated duplex data link for bi-directional communication over single mode optical fiber. It is compliant with the Gigabit Interface Converter (GBIC) specification Rev. 5.5.

Eoptolink's GBIC transceiver is hot pluggable which allows a suitably designed enclosure to be changed from one type of external interface to another simply by plugging in a GBIC having the alternative external interface.

The converters are suitable for interconnections in the Gigabit Ethernet hubs and switches environment. The design of these converters is also practical for other high performance, point-to-point communication requiring gigabit or fiber channel interconnections.

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Storage Temperature	T _s	-40		85	°C	
Supply Voltage	V _{CC}	0		6	V	

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Ambient Operating Temperature	T _A	0		70	°C	
Supply Voltage	V _{CC}	3.15	3.3/5	5.25	V	
Total Supply Current	I _S			300	mA	
Data Output Load	R _L		75		ohms	

PERFORMANCE SPECIFICATIONS - ELECTRICAL

 $0^{\circ}\text{C} < T_c < +80^{\circ}\text{C}; +3.15\text{V} < V_{cc} < +5.25\text{V}$

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Surge Current	I _{surge}			+30	mA	Above steady state value
TRANSMITTER						
PECL Input (Differential)	V _{in}	650		2000	mVpp	Ac coupled inputs
Input Impedance (Differential)	Z _{in}	135	150	165	ohms	R _{in} > 100 kohms @ DC
Tx_DISABLE Input Voltage - High		2		V _{DDT} +0.3	V	
Tx_DISABLE Input Voltage - Low		0		0.8	V	
Tx_FAULT Output Voltage -- High		V _{cc} -0.5		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						
PECL Output (Differential)	V _{out}	400	750	2000	mVpp	AC coupled outputs
Output Impedance (Differential)	Z _{out}	135	150	165	ohms	
Rx_LOS Output Voltage - High		V _{cc} -0.5		V _{cc} +0.3	V	I _o = 400μA; Host V _{cc}
Rx_LOS Output Voltage - Low		0		0.5	V	I _o = -4.0mA
Total Jitter [Pk - Pk]	T _J			130	ps	Measured with 2 ⁷ - 1 PRBS
MOD_DEF (0:2)	V _{oH}	2.5			V	With Serial ID
	V _{oL}	0		0.5	V	

OPTICAL SPECIFICATIONS

 $0^{\circ}\text{C} < T_c < +80^{\circ}\text{C}; +3.15\text{V} < V_{cc} < +5.25\text{V}$

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
				10		
				20		

				40			
TRANSMITTER							
Optical Wavelength	Center	λ	1290	1310	1330	nm	
Spectral Width		$\Delta\lambda$		3		nm	RMS
Optical Transmit Power	10Km	P_o	-9.5		-3	dBm	Average @1310nm
	20Km		-5.5		0		
	40Km		-2		+3		
Extinction Ratio		ER	9			dB	P1/P0
Total Jitter		TJ			170	ps	Measured with $2^7 - 1$ PRBS
Output Rise/Fall Time		tR, tF			260	ps	20-80%; measured unfiltered
RECEIVER							
Optical Wavelength	Input	λ	1100	1310	1650	nm	
Optical Input Power	10Km	P_{in}	-20		-3	dBm	BER<1.0E-12 @ 1.25/1.0625GBaud
	20Km		-22		-3		
	40Km		-24		-3		
Optical Return Loss		ORL	12			dB	
RX_LOS - Asserted		P_a	-32			dBm	Measured on transition - Low to High
RX_LOS - Deasserted		P_d			-20	dBm	Measured on transition - High to Low

Pin Out Table

Pin Name	Pin#	Sequence	Sequence	Pin#	Pin Name
RX_LOS	1	2	1	11	RGND
RGND	2	2	1	12	-RX_DAT
RGND	3	2	1	13	+RX_DAT
MOD_DEF(0)	4	2	1	14	RGND
MOD_DEF(1)	5	2	2	15	VDDR
MOD_DEF(2)	6	2	2	16	VDDT
TX_DISABLE	7	2	1	17	TGND
TGND	8	2	1	18	+TX_DAT
TGND	9	2	1	19	-TX_DAT
TX_FAULT	10	2	1	20	TGND

Internal interface signal Definition

Pin Name	Pin #	Name/Function	Signal Specification
Receiver Signals			
RGND	2,3,11, 14	Receiver Ground(may be connected with TGND in GBIC)	Ground, to GBIC

VDDR	15	Receiver +5 volt (may be connected with VDDT in GBIC)	Power, to GBIC
-RX_DAT	12	Receive Data, Differential PECL	High speed serial, from GBIC
+RX_DAT	13	Receive Data, Differential PECL	High speed serial, from GBIC
RX_LOS	1	Receiver Loss of Signal, logic high, open collector compatible, 4.7 K to 10 K Ohm pullup to VDDT on host	Low speed, from GBIC
Transmitter Signals			
TGND	8,9,17, 20	Transmitter Ground (may be connected with RGND internally)	Ground, to GBIC
VDDT	16	Transmitter +5 volt (may be connected with VDDR in GBIC)	Power, to GBIC
+TX_DAT	18	Transmit Data, Differential PECL	High speed serial, to GBIC
-TX_DAT	19	Transmit Data, Differential PECL	High speed serial, to GBIC
TX_DISABLE	7	Transmitter Disable, logic high, open collector compatible, 4.7K to 10 K Ohm pullup to VDDT on GBIC	Low speed, to GBIC
TX_FAULT	10	Transmitter Fault, logic high, open collector compatible, 4.7 Kto 10 K Ohm pullup to VDDT on host	Low speed, from GBIC
Control Signals			
MOD_DEF(0)	4	GBIC module definition and presence, bit 0, 4.7 K to 10 K Ohm pullup to VDDT on host	Low speed, from GBIC
MOD_DEF(1)	5	GBIC module definition and presence, bit 1, 4.7 K to 10 K Ohm pullup to VDDT on host	Low speed, from GBIC
MOD_DEF(2)	6	GBIC module definition and presence, bit 2, 4.7 K to 10 K Ohm pullup to VDDT on host	Low speed, from GBIC

Recommend Circuit Schematic

Inputs to the FOCUS-1312-XX transmitter are AC coupled and internally terminated through 75 ohms to AC ground. The advantages of AC couple are as followed:

- (1) Close positioning of SERDES with respect to transceiver; allows for shorter line lengths and at gigabit speeds reduces EMI.
- (2) Minimum number of external components.
- (3) Internal termination reduces the potential for unterminated stubs which would

otherwise increase jitter and reduce transmission margin.

These modules can operate with PECL logic level. The input signal must have at least a 650mV peak-to-peak (differential) signal swing. Output from the receiver section of the module is also AC coupled PECL level and is expected to drive into a 75 ohm load. Different termination strategies may be required depending on the particular Serializer/Deserializer chip set used.

?

Figure 1 illustrates the recommended transmit and receive data line terminations.

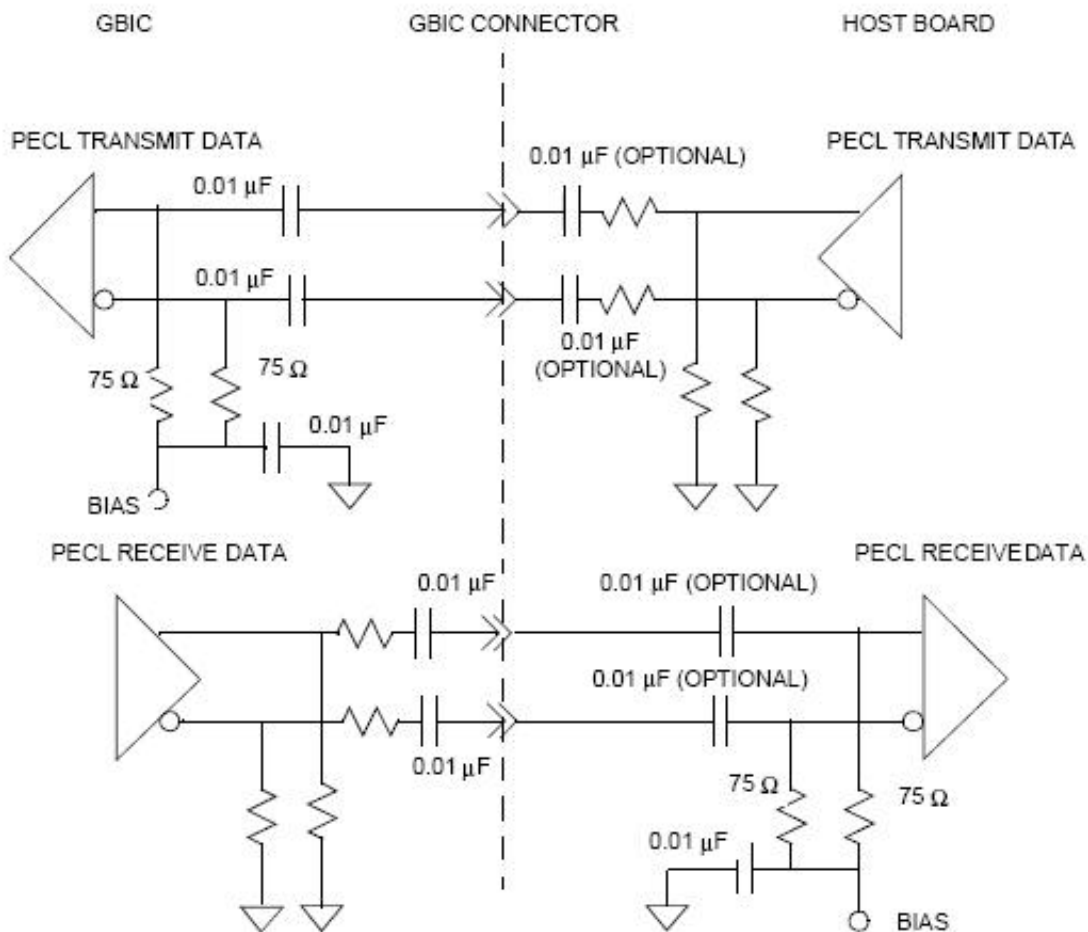


Figure 1: Example of termination circuits for Drivers and Receivers in the host and the GBIC

Mechanical Specifications

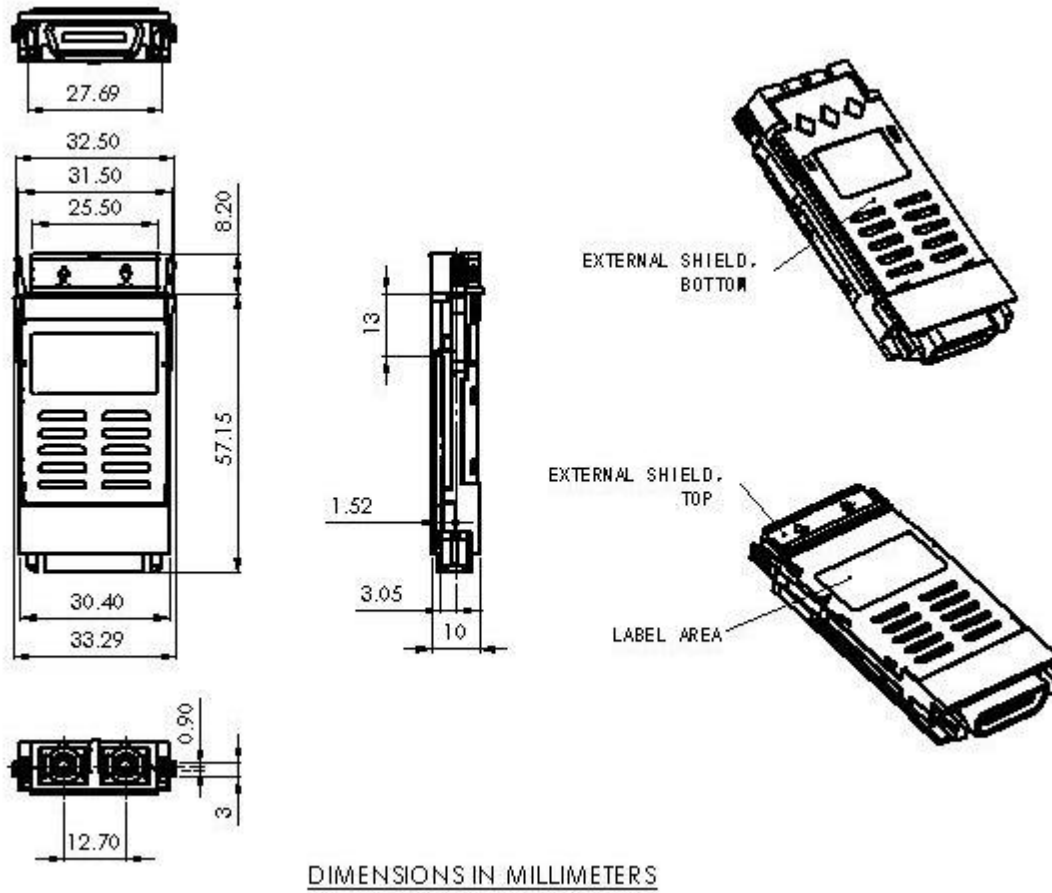


Figure 2: Mechanical Design Diagram

Ordering information

Part No.	Data Rate	Laser	Fiber Type	Distance	Optical interface
FOCUS-1312-10	1.25/1.0625Gbps	1310nm FP	SMF	10Km	SC
FOCUS-1312-20	1.25/1.0625Gbps	1310nm FP	SMF	20Km	SC
FOCUS-1312-40	1.25/1.0625Gbps	1310nm DFB	SMF	40Km	SC