

## FOCUS-1512-XX 1550nm

### 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
- 1550nm DFB Laser for 60Km and 80Km transmission
- Extended power supply +3.3/5.0V compatible
- Hot Pluggable
- Fully metallic enclosure for low EMI
- Low power dissipation

#### Applications

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

#### Product Description

Eoptolink's FOCUS-1512-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	Ts	-40		85	°C	
Supply Voltage	VCC	0		6	V	

## Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Ambient Operating Temperature	$T_A$	0		70	°C	
Supply Voltage	VCC	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	$I_{\text{surge}}$			+30	mA	above steady state value
<b>TRANSMITTER</b>						
PECL Input (Differential)	$V_{\text{in}}$	650		2000	mVpp	AC coupled inputs
Input Impedance (Differential)	$Z_{\text{in}}$	135	150	165	ohms	$R_{\text{in}} > 100 \text{ kohms @ DC}$
Tx_DISABLE Input Voltage - High		2		$V_{\text{DDT}}+0.3$	V	
Tx_DISABLE Input Voltage - Low		0		0.8	V	
Tx_FAULT Output Voltage -- High		$V_{\text{cc}}-0.5$		$V_{\text{cc}}+0.3$	V	$I_o = 400\mu\text{A}$ ; Host Vcc
Tx_FAULT Output Voltage -- Low		0		0.5	V	$I_o = -4.0\text{mA}$
<b>RECEIVER</b>						
PECL Output (Differential)	$V_{\text{out}}$	400	750	2000	mVpp	AC coupled outputs
Output Impedance (Differential)	$Z_{\text{out}}$	135	150	165	ohms	
Rx_LOS Output Voltage - High		$V_{\text{cc}}-0.5$		$V_{\text{cc}}+0.3$	V	$I_o = 400\mu\text{A}$ ; Host Vcc
Rx_LOS Output Voltage - Low		0		0.5	V	$I_o = -4.0\text{mA}$
Total Jitter [ Pk - Pk ]	TJ			130	ps	Measured with 27 - 1 PRBS
MOD_DEF ( 0:2 )	$V_{\text{OH}}$	2.5			V	With Serial ID
	$V_{\text{OL}}$	0		0.5	V	

**OPTICAL SPECIFICATIONS**

0°C&lt;Tc&lt;+80°C; +3.15V&lt;Vcc&lt;+5.25V

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
9μm Core Diameter SMF				60 80	Km	BER<1.0E-12 @ 1.25/1.0625GBaud
<b>TRANSMITTER</b>						
Optical Center Wavelength	$\lambda$	1520		1580	nm	
Spectral Width	$\Delta\lambda$			1	nm	RMS
Side Mode Suppression Ratio(SMSR)	SMSR	30			dB	
Optical Transmit Power	Po	-5 0		0 4	dBm	Average @1550nm
Extinction Ratio	ER	9			dB	P1/P0
Total Jitter	TJ			170	ps	Measured with 2 <sup>7</sup> - 1 PRBS
Output Rise/Fall Time	tR, tF			260	ps	20-80%; measured unfiltered
<b>RECEIVER</b>						
Optical Input Wavelength	$\lambda$	1100		1650	nm	
Optical Input Power	P <sub>in</sub>	-25		-1	dBm	BER<1.0E-12 @ 1.25/1.0625GBaud
Optical Return Loss	ORL	12			dB	
RX_LOS - Asserted	Pa	-35			dBm	Measured on transition - Low to High
RX_LOS - Deasserted	Pd			-24	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
<b>Receiver Signals</b>			
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
<b>Transmitter Signals</b>			
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
<b>Control Signals</b>			
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-1512-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.

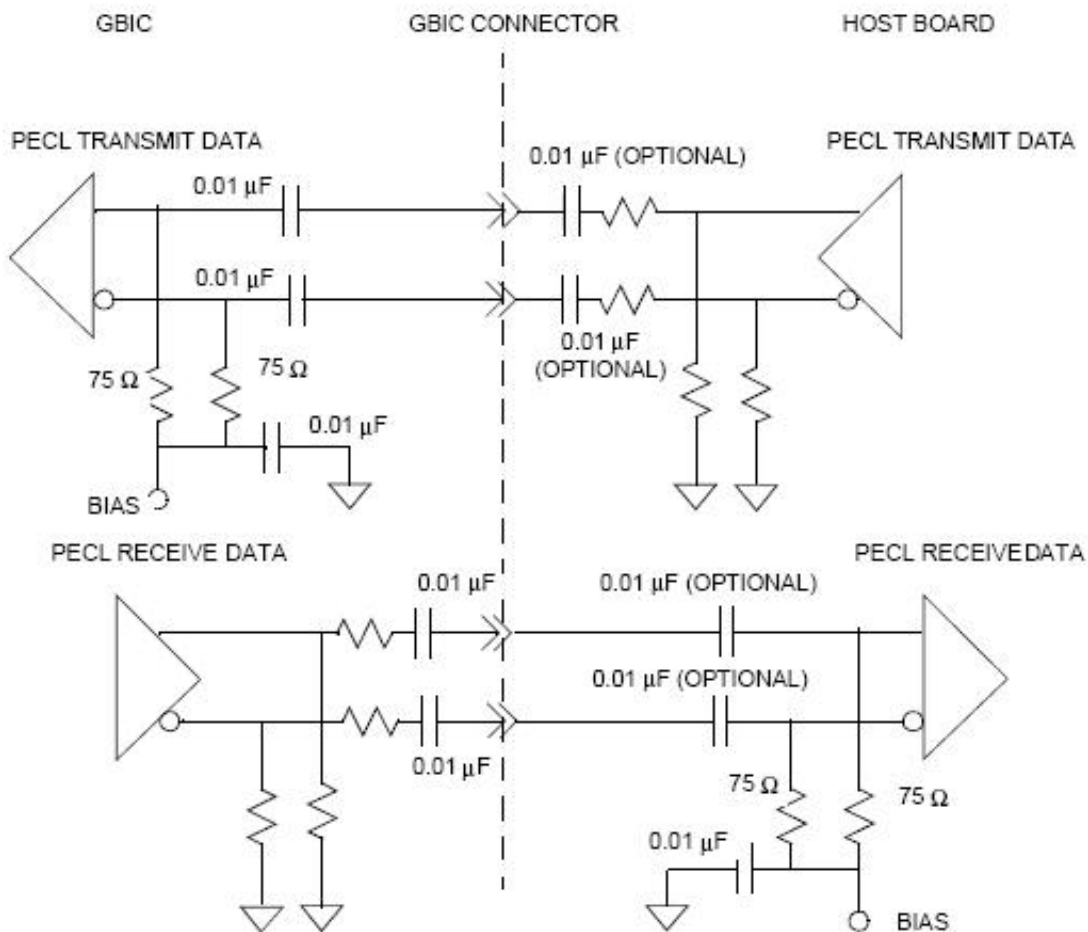


Figure 1: Example of termination circuits for Drivers and Receivers in the host and the GBIC

## Mechanical Specifications

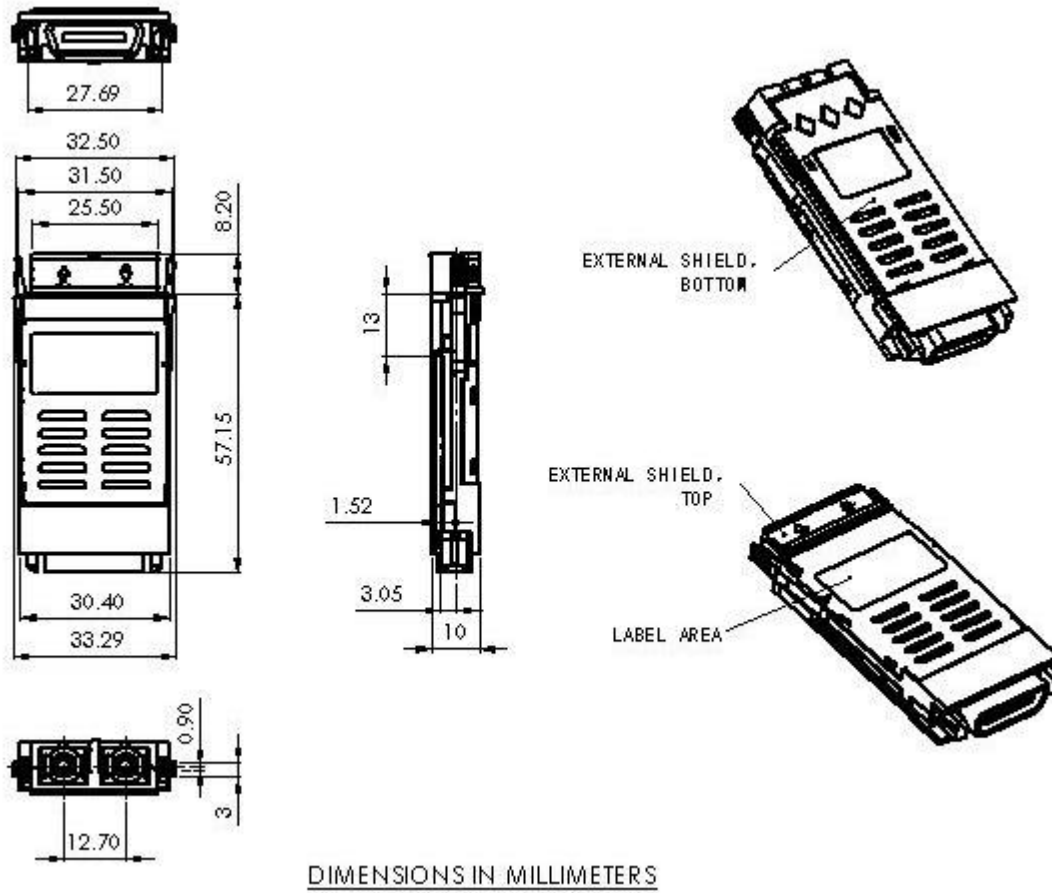


Figure 2: Mechanical Design Diagram

## Ordering information

Part No.	Data Rate	Laser	Fiber Type	Distance	Optical interface
FOCUS-1512-60	1.25/1.0625Gbps	1550nm DFB	SMF	60km	SC
FOCUS-1512-80	1.25/1.0625Gbps	1550nm DFB	SMF	80km	SC