

## EOLT-C12-02-M

## EOLT-C12-02-CM

1000BASE-T Copper SFP Transceiver  
RoHS6 Compliant

### Features

- ◆ Support 1000BASE-T Operation in Host Systems
- ◆ For 100m Reach Over UTP Cat5 Cable
- ◆ Hot-Pluggable SFP Footprint
- ◆ Fully Metallic Enclosure for Low EMI
- ◆ Low Power Dissipation (1.05W Typical)
- ◆ Compact RJ-45 Connector Assembly
- ◆ Access to Physical Layer IC via 2-Wire Serial Bus
- ◆ Detailed Product Information in EEPROM
- ◆ Compliant with SFP MSA
- ◆ Operating Case Temperature:  
Standard: 0°C~70°C  
Industrial: -40°C~85°C
- ◆ Compliant with IEEE Std 802.3-2002



### Applications

- ◆ LAN 1000Base-T
- ◆ Gigabit Ethernet over Cat 5 Cable
- ◆ Switch to Switch Interface
- ◆ Router/Server Interface

### Order Information

Part No.	Data Rate	Media type	Distance	Rx-LOS	Temp.
EOLT-C12-02-CM	Copper Side: 1000 Base-T Preferred Master Host Side: Serdes without Auto-neg	Cat5	100m	NO	Standard

EOLT-C12-02-CI M	Copper Side: 1000 Base-T Preferred Master Host Side: Serdes without Auto-neg	Cat5	100m	NO	Industrial
EOLT-C12-02-M	Copper Side: 1000 Base-T Preferred Master Host Side: Serdes without Auto-neg	Cat5	100m	YES	Standard
EOLT-C12-02-IM	Copper Side: 1000 Base-T Preferred Master Host Side: Serdes without Auto-neg	Cat5	100m	YES	Industrial

Note1: Standard version

\*The product image only for reference purpose.

### Regulatory Compliance<sup>\*Note2</sup>

Product Certificate	Certificate Number	Applicable Standard
TUV	R50135086	EN 60950-1:2006+A11+A1+A12+A2
		EN 60825-1:2014
		EN 60825-2:2004+A1+A2
UL	E317337	UL 60950-1
		CSA C22.2 No. 60950-1-07
EMC CE	AE 50285865 0001	EN 55022:2010
		EN 55024:2010
FCC	WTF14F0514417E	47 CFR PART 15 OCT., 2013
FDA	/	CDRH 1040.10
ROHS	/	2011/65/EU

Note2: The above certificate number updated to June 2014, because some certificate will be updated every year, such as FDA and ROHS. For the latest certification information, please check with Eoptolink.

### Product Description

EOLT-C12-02-CM 1000BASE-T Copper Small Form Pluggable (SFP) modules are based on the SFP Multi Source Agreement (MSA). It is compliant with the Gigabit Ethernet and 1000BASE-T standards as specified in IEEE STD 802.3 and 802.3ab.

## Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Units
Maximum Supply Voltage	V <sub>cc</sub>	-0.5		4.0	V
Storage Temperature	T <sub>s</sub>	-40		85	°C

## Normal operating condition

Parameter	Symbol	Min	Typ	Max	Units	Ref.
Operating Case Temperature	Top	0		70	°C	Standard
		-40		85		Industrial
Supply Voltage	V <sub>cc</sub>	3.14	3.3	3.46	V	

## Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Units	Notes/Conditions
<b>+3.3 Volt Electrical Power Interface</b>						
Supply Current	I <sub>cc</sub>		300	350	mA	
Input Voltage	V <sub>cc</sub>	3.13	3.3	3.47	V	
Surge Current	I <sub>surge</sub>			30	mA	
<b>Low-Speed Signals, Electronic Characteristics</b>						
SFP Output LOW	V <sub>OL</sub>	0		0.5	V	4.7k to 10k pull-up to host_V <sub>cc</sub> , measured at host side of connector
SFP Output HIGH	V <sub>OH</sub>	host_V <sub>cc</sub> - 0.5		host_V <sub>cc</sub> + 0.3	V	4.7k to 10k pull-up to host_V <sub>cc</sub> , measured at host side of connector
SFP Input LOW	V <sub>IL</sub>	0		0.8	V	4.7k to 10k pull-up to V <sub>cc</sub> , measured at SFP side of connector
SFP Input HIGH	V <sub>IH</sub>	2		V <sub>cc</sub> + 0.3	V	4.7k to 10k pull-up to V <sub>cc</sub> , measured at SFP side of connector
<b>High-Speed Electrical Interface, Transmission Line-SFP</b>						
Line Frequency	f <sub>L</sub>		125		MHz	5-level encoding, per IEEE 802.3
Tx Output impedance	Z <sub>out,TX</sub>		100		Ohm	Differential, for all frequencies between 1MHz

						and 125MHz
Rx Input Impedance	Z <sub>in,RX</sub>		100		Ohm	Differential, for all frequencies between 1MHz and 125MHz
<b>High-Speed Electrical Interface, Host-SFP</b>						
Single ended data input swing	V <sub>in</sub>	250		1200	mV	Single ended
Single ended data output swing	V <sub>out</sub>	350		800	mV	Single ended
Rise/Fall Time	T <sub>r</sub> ,T <sub>f</sub>		175		psec	20%-80%
Tx Input Impedance	Z <sub>in</sub>		50		Ohm	Single ended
Rx Output Impedance	Z <sub>out</sub>		50		Ohm	Single ended

## General specifications

Parameter	Symbol	Min	Typ	Max	Units	Notes/ Conditions
Data rate			1000		Mbps	
Distance				100	m	Cat 5 UTP. BER <10 <sup>-12</sup>

## Pin Descriptions

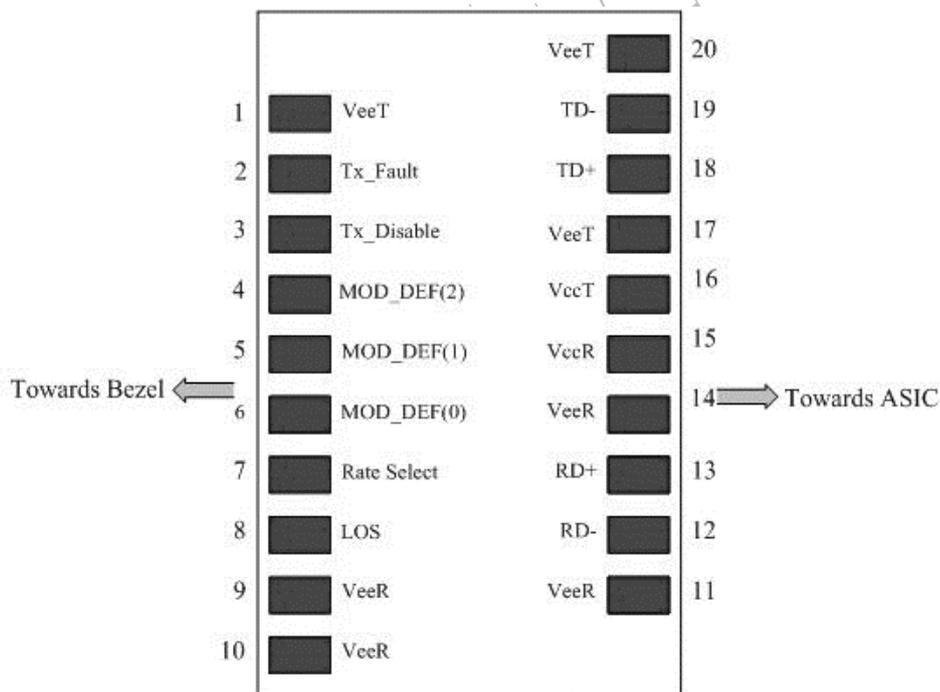
Pin No.	Name	Function	Plug Seq.	Notes
1	VeeT	Transmitter Ground	1	
2	TX Fault	Transmitter Fault Indication	3	Not used
3	TX Disable	Transmitter Disable	3	1
4	MOD-DEF2	Module Definition 2	3	2
5	MOD-DEF1	Module Definition 1	3	2
6	MOD-DEF0	Module Definition 0	3	2
7	Rate Select	Not Connected	3	
8	LOS	Loss of Signal	3	Not used
9	VeeR	Receiver Ground	1	
10	VeeR	Receiver Ground	1	
11	VeeR	Receiver Ground	1	
12	RD-	Inv. Received Data Out	3	
13	RD+	Received Data Out	3	

14	VeeR	Receiver Ground	1	
15	VccR	Receiver Power	2	
16	VccT	Transmitter Power	2	
17	VeeT	Transmitter Ground	1	
18	TD+	Transmit Data In	3	
19	TD-	Inv. Transmit Data In	3	
20	VeeT	Transmitter Ground	1	

### Notes:

1. PHY disabled on TDIS > 2.0V or open, enabled on TDIS < 0.8V, used to reset the module.
2. Should be pulled up with 4.7k – 10k Ohm on host board to a voltage between 2.0 V and 3.6 V. MOD\_DEF(0) pulls line low to indicate module is plugged in.

The following is the Diagram of host board connector block pin numbers and names



## Serial Communication Protocol

Eoptolink Copper SFPs support the 2-wire serial communication protocol outlined in the SFP MSA. These SFP use a 128 byte EEPROM with an address of A0H. The 1000BASE-T physical layer IC can also be accessed via the 2-wire serial bus at address ACH.

## EEPROM Serial ID Memory Contents

Accessing Serial ID Memory uses the 2 wire address 1010000X (A0H). Memory Contents of Serial ID are shown in Table 1.

**Table 1 Serial ID Memory Contents**

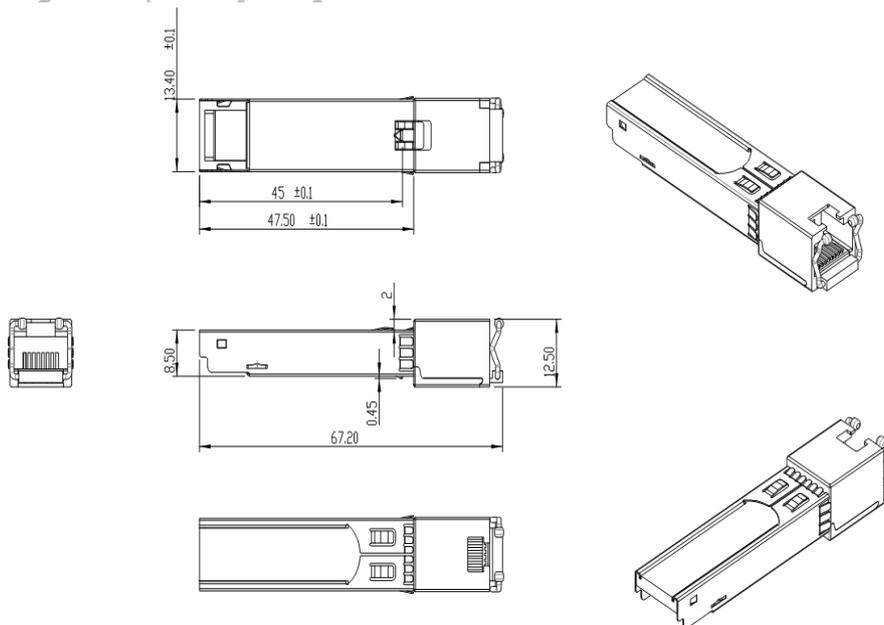
Addr.	Size (Bytes)	Name of Field	Hex	Description
<b>BASE ID FIELDS</b>				
0	1	Identifier	03	SFP
1	1	Ext. Identifier	04	SFP function is defined by serial ID only
2	1	Connector	00	-
3-10	8	Transceiver	00 00 00 08 00 00 00 00	Transmitter Code
11	1	Encoding	01	8B10B
12	1	BR, Nominal	0D	1000Mbps
13	1	Reserved	00	-
14	1	Length (9μm)km	-	Transceiver transmit distance
15	1	Length(9μm)100m	-	
16	1	Length (50μm) 10m	-	
17	1	Length(62.5μm)10m	-	
18	1	Length (Copper)	64	100m
19	1	Reserved	00	-
20-35	16	Vendor name	XX XX XX XX XX XX XX XX <sup>(note3)</sup> 20 20 20 20 20 20 20 20	Vendor name (ASCII)
36	1	Reserved	00	-
37-39	3	Vendor OUI	XX XX XX <sup>(note3)</sup>	-
40-55	16	Vendor PN	XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX <sup>(note3)</sup>	Transceiver part number
56-59	4	Vendor rev	XX XX XX XX <sup>(note3)</sup>	-
60-61	2	Wavelength	00	-
62	1	Reserved	00	-
63	1	CC_BASE	Check Sum (Variable)	Check code for Base ID Fields
<b>EXTENDED ID FIELDS</b>				
64-65	2	Options	00 00	TX_DISABLE, TX_FAULT and Loss of Signal implemented.

66	1	BR,max	00	
67	1	BR,min	00	
68-83	16	Vendor SN	XX XX XX XX XX XX XX XX 20 20 20 20 20 20 20 20 <sup>(note3)</sup>	Serial Number of transceiver (ASCII). For example "B000822".
84-91	8	Date code	XX XX XX XX XX XX XX XX <sup>(note3)</sup>	Manufactory date code. For example "080405".
92	1	Diagnostic Monitoring Type	XX <sup>(note3)</sup>	Digital diagnostic monitoring implemented
93	1	Enhanced Options	XX <sup>(note3)</sup>	Optional flags
94	1	SFF_8472 Compliance	XX <sup>(note3)</sup>	01 for diagnostics (Rev9.3 SFF-8472).
95	1	CC_EXT	Check Sum (Variable)	Check sum for Extended ID Field.
<b>VENDOR SPECIFIC ID FIELDS</b>				
96-127	32	Vendor Specific	Read only	Depends on customer information
128-255	128	Reserved	Read only	-

Note3: The "XX" byte should be filled in according to practical case. For more information, please refer to the related document of SFP Multi-Source Agreement (MSA).

## Mechanical Specifications

Eoptolink's Copper SFP transceivers are compliant with the dimensions defined by the SFP Multi-Sourcing Agreement (MSA).



\*This 2D drawing only for reference, please check with Eoptolink before ordering.

## Obtaining Document

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<http://www.eoptolink.com>

Or contact Eoptolink Technology Inc., Ltd. Listed at the end of the documentation to get the latest documents.

## Revision History

Revision	Initiated	Review	Approved	Revision History	Release Date
V1.a	Tim.Liang	Kelly.Cao Florence.Dai		Released.	Sep 16, 2007
V1.b	Phlio	Kelly		Delete the item7 in Note2.	2009-6-20
V1.c	Kelly			Change the logo.	2010-1-6
V1.d	Cathy			Add industrial temperature.	2011-3-28
V1.e	Kelly			Update EEPROM	2011-5-21
V1.f	Kelly			Update PN.	2012-1-12
V1.g	Xavi	Torres/Angela		Update the part number, regulatory compliance, 2D drawing and contact.	May 10, 2018

### Notice:

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