
Product Specification

1.25Gbps Copper SFP Transceiver

HD-GLC-T1&HD-GLC-T2

Product Features

- Up to 1.25Gbps bi-directional data links *1
- RJ45 Max100m
- Fully metallic enclosure for low EMI
- Compact RJ-45 Connector assembly
- Hot-pluggable SFP footprint
- Low power dissipation
- Extended case temperature: 0°C to 85°C



Applications

- RoHS compliant and Lead Free
- ✓ 1.25 Gigabit Ethernet
- Access to physical layer IC via 2-wire serial bus over Cat 5 cable
- 10/100/1000BASE-T operation in host systems with SGMII interface *1

*1

Part Number	Data Rate
HD-GLC-T1	1000M
HD-GLC-T2	10/100/1000M

1. Product Description

The HD-GLC-T1 & HD-GLC-T2 are Copper Small Form pluggable (SFP) transceiver, which are based on SFP multi-sourcing agreement (MSA). They are compatible with the Gigabit Ethernet and 1000BASE-T standards as specified in

IEEE Std 802.3. The 1000BASE-T physical layer IC(PHY) can be accessed via I2C, allowing access to all PHY settings and features. The CLSFPGEBDTX2 is compatible with 1000BASE-X auto-negotiation, but does not have a link indication feature(RX-LOS is internally grounded).

PRODUCT SELECTION

Part Number	Link Indicator on RX LOS Pin	1000BASE-X auto-negotiation enabled by default
HD-GLC-T1	NO	YES
HD-GLC-T2	NO	YES

2. Regulatory Compliance

Handar transceivers are Class 1 Laser Products comply with FDA regulations. Meet Class 1 eye safety requirements of EN 60825 and the electrical safety requirements of EN 60950.

3. +3.3V Volt Electrical Power Interface

The HD-GLC-T1/2 has an input voltage range of 3.3V +/-5%, The 4 V maximum voltage is not allowed for continuous operation.

Parameter	Symbol	Min.	Typ	Max	Units	Notes/Conditions
Supply Current	I _s	300	325	345	mA	1.2W max power over full range of voltage and temperature. see caution note below
Power Supply Voltage	V _{cc}	3.13	3.3	3.47	v	Referenced to GND
Maximum Voltage	V _{max}				v	
Surge Current	I _{surge}			345	mA	Hot plug above steady state current, See caution note below

Caution: Power consumption and surge current are higher than the specified values in the SFP MSA

Table 1.+3.3 Volt electrical power interface

4. Low-Speed Signals

Parameter	Symbol	Min.	Max	Units	Notes/Conditions
SFP Output LOW	VOL	0	0.5	V	4.7k to 10k pull-up to host Vcc, measured at host side of connector
SFP Output HIGH	VOH	Host Vcc-0.5	Host Vcc+0.3	V	4.7k to 10k pull-up to host Vcc, measured at host side of connector
SFP Input LOW	VIL	0	0.8	V	4.7k to 10k pull-up to Vcc, measured at SFP side of connector
SFP Input HIGH	VIH	2	Vcc+0.3	V	4.7k to 10k pull-up to Vcc, measured at SFP side of connector

Table 2. Low-speed signals, electronic characteristics

5. High-Speed Electrical Interface

ALL high-speed signals are AC-coupled internally

(1)High-speed Electrical Interface Transmission Line-SFP

Parameter	Symbol	Min.	Typ	Max	Units	Notes/Conditions
Line Frequency	Is	10	125	1000	MHZ	5-level encoding, per IEEE 802.3
Tx Output Impedance	Zout,TX		100		Ohm	Differential, for all frequencies between 1MHz and 125MHz
Rx Input Impedance	Zin,RX		100		Ohm	Differential, for all frequencies between 1MHz and 125MHz

Table 3. High-speed electrical interface, transmission line-SFP

(2)High-speed Electrical Interface, Host-SFP

Parameter	Symbol	Min.	Typ	Max	Units	Notes/Conditions
Single ended data input swing	Vinsing	250		1200	mV	Single ended
Single ended data output swing	Voutsing	350		800	mV	Single ended
Rise/Fall Time	Tr,Tf		175		psec	20%-80%
Tx Input Impedance	Zin		50		Ohm	Single ended
Rx Output Impedance	Zout		50		Ohm	Single ended

Table 4. High-speed electrical interface, host-SFP

6. General Specifications

Parameter	Symbol	Min.	Typ	Max	Units	Notes/Conditions
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Data Rate	BR	10		1000	Mb/sec	IEEE 802.3 compatible. See Notes 2 through 4 below
Tx Output Impedance	L			100	M	Category 5 UTP.BER<10 ⁻¹²

Table 5. General specifications

Note:

- 1.Clock tolerance is +/- 50 ppm
- 2.By default, the HD-GLC-T1/2 is a full duplex device in preferred master mode
- 3.Automatic crossover detection is enabled. External crossover cable is not required
- 4.10/100/1000 BASE-T operation requires the host system to have an SGMII interface with no clocks, and the module PHY to be configured per Applications Note AN-2036.With a SERDES that does not support SGMII, the module will operate at 1000BASE-T only.

7. Environmental Specifications

The HD-GLC-T1/2 has an extended range from 0°C to +85°C case temperature as specified in Table.

Parameter	Symbol	Min.	Typ	Max	Units	Notes/Conditions
Operating Temperature	Top	0		85		Case temperature
Storage Temperature	Tsto	-40		85		Ambient temperature

Table 6. Environmental specifications

8. Pin Descriptions

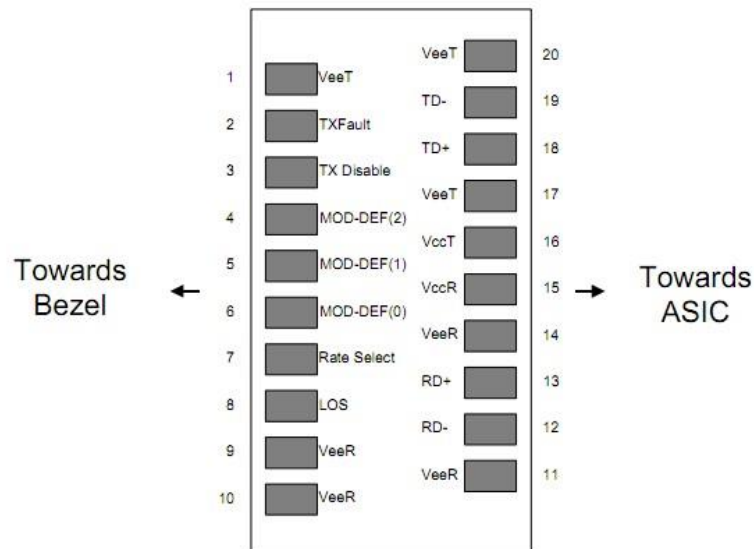


Diagram of Host Board Connector Block Pin Numbers and Names

Pin	Symbol	Description	Ref.
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1	VEET	Transmitter Ground (Common with Receiver Ground)	8.1
2	TFAULT	Transmitter Fault. Not supported.	
3	TDIS	Transmitter Disable. Laser output disabled on high or open.	8.2
4	MOD_DEF(2)	Module Definition 2. Data line for Serial ID.	8.3
5	MOD_DEF(1)	Module Definition 1. Clock line for Serial ID.	8.3
6	MOD_DEF(0)	Module Definition 0. Grounded within the module.	8.3
7	Rate Select	No connection required	
8	LOS	Grounded	8.4
9	VEER	Receiver Ground (Common with Transmitter Ground)	8.1
10	VEER	Receiver Ground (Common with Transmitter Ground)	8.1
11	VEER	Receiver Ground (Common with Transmitter Ground)	8.1
12	RD-	Receiver Inverted DATA out. AC Coupled.	
13	RD+	Receiver Non-inverted DATA out. AC Coupled.	
14	VEER	Receiver Ground (Common with Transmitter Ground)	8.1
15	VCCR	Receiver Power Supply	
16	VCCT	Transmitter Power Supply	
17	VEET	Transmitter Ground (Common with Receiver Ground)	8.1
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled.	
19	TD-	Transmitter Inverted DATA in. AC Coupled.	
20	VEET	Transmitter Ground (Common with Receiver Ground)	8.1

Table 7. SFP to host connector pin assignments and descriptions

Notes:

8.1 Circuit ground is connected to chassis ground.

8.2 PHY disabled on TDIS>2.0V or open,enabled on TDIS<0.8V.

8.3 Should be pulled up with 4.7k - 10k Ohms on host board to a voltage between 2.0V and 3.6V. MOD_DEF(0) pulls line low to indicate module is plugged in.

9. Serial Communication Protocol

All Handar SFPS support the 2-wire serial communication protocol outlined in the SFP MSA. These SFPS use an Atmel AT24C01A 128 byte E2PROM with an address of A0h. For details on interfacing with the E2PROM, see the Atmel data sheet titled “AT24C01A/02/04/08/16 2-Wire Serial CMOS E2PROM.”

The 1000BASE-T physical layer IC can also be accessed via the 2-wire serial bus at address Ach. For details interfacing with the PHY IC, see Marvell data sheet titled “Alaska Ultra 88E1111 Integrated Gigabit Ethernet Transceiver”(Marvell document number MV-S100649-00).

Serial Bus Timing Requirements

Parameter	Symbol	Min.	Typ	Max	Units	Notes/Conditions
IC Clock Rate		0		100000	Hz	

Ordering Information

Part No.	Data Rate	Laser	Fiber Type	Distance	Optical Interface
HD-GLC-T1	1000M			100m	RJ45
HD-GLC-T2	10/100/1000M			100m	RJ45

Custom requirement:

1) EEPROM

2 wire address 1010000X (A0h)

0~95 Serial ID Defined by SFP MSA (96 bytes)
96~127 Vendor Specific (32 bytes)
128~255 Reserved (128 bytes)

EEPROM Serial ID Memory Contents

Add.	Size (Bytes)	Name of Field	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	22	RJ45 Connector
3-10	8	Transceiver	00 00 00 08 00 00 00 00	Transmitter Code
11	1	Encoding	01	8B/10B
12	1	BR, Nominal	0D	1.25Gbps
13	1	Reserved	00	
14	1	Length (9um) km	00	Transceiver Transmit Distance
15	1	Length (9um) 100m	00	
16	1	Length (50um) 10m	00	
17	1	Length (62.5um) 10m	00	
18	1	Length (Copper)	64	100m
19	1	Reserved	00	
20-35	16	Vendor Name	43 2D 4C 49 47 48 54 20 20 20 20 20 20 20 20 20	HD * OEM available
36	1	Reserved	00	

37-39	3	Vendor OUI	00 00 00	
40-55	16	Vendor PN	xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx	* OEM available
56-59	4	Vendor Rev	30 31 20 20	01
60-61	2	Wavelength	00 00	0nm
62	1	Reserved	00	
63	1	CC_BASE	xx	Check Code for Base ID Field
EXTENDED ID FIELDS				
64-65	2	Options	00 00	
66	1	BR, Max	00	
67	1	BR, Min	00	
68-83	16	Vendor SN	43 4C xx xx xx xx xx xx xx xx xx xx 20 20 20 20	SN of Transceiver (ASCII). Exp. "HDXXXXXXXXXX"
84-91	8	Date Code	xx xx xx xx xx xx 20 20	Exp. 120727
92	1	Diagnostic Monitoring	00	DDM Not implemented
93	1	Enhanced Options	00	Optional flags not implement
94	1	SFF_8472 Compliance	00	Not defined
95	1	CC_EXT	checksum	Checksum for Extended ID
VENDOR SPECIFIC ID FIELDS				
96-127	32	Vendor Specific	20 20 20.....	Depends on Customer Info
128-255	128	Reserved	FF FF FF.....	Depends on Customer Info