

[GLC-TE]

1000Base-T Copper SFP Transceiver

Features

- Up to 1.25Gb/s bi-directional data links
- Hot-pluggable SFP footprint
- Extended case temperature range
- Fully metallic enclosure for low EMI
- Low power dissipation
- Compact RJ-45 connector assembly
- Access to physical layer IC via 2-wire serial bus
- 1000 BASE-T operation in host systems with SERDES interface
- 10/100/1000Mbps compliant in host systems with SGMII interface



Applications

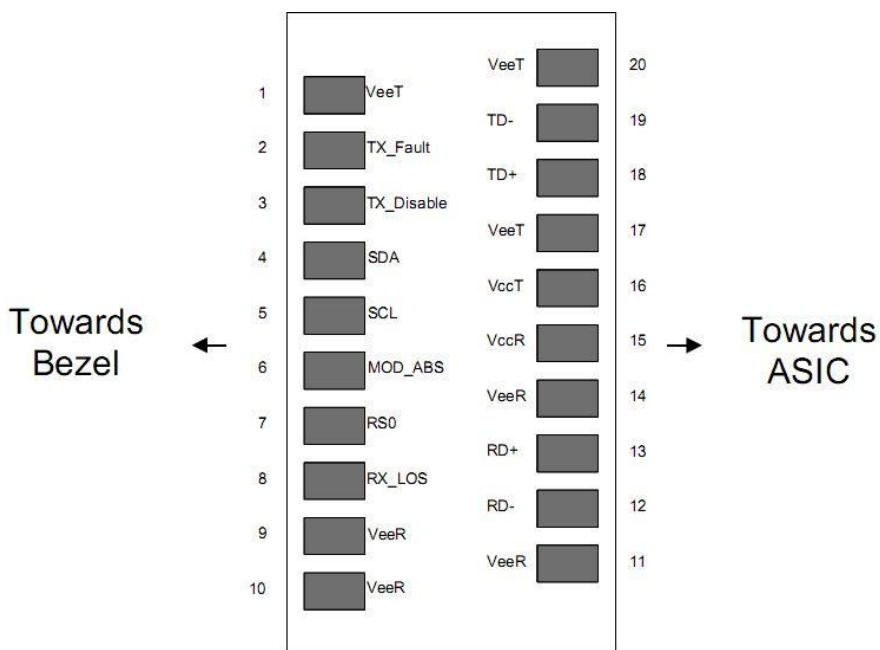
- 1.25 Gigabit Ethernet over Cat 5 cable

Description

Nsystems's GLC-TE Copper Small Form Pluggable (SFP) transceivers are high performance, cost effective module compliant with the Gigabit Ethernet and 1000BASE-T standards as specified in IEEE 802.3-2002 and IEEE 802.3ab, which supporting 1000Mbps data-rate up to 100 meters reach over unshielded twisted-pair category 5 cables.

The module supports 1000 Mbps full duplex data-links with 5-level Pulse Amplitude Modulation (PAM) signals. All four pairs in the cable are used with symbol rate at 250Mbps on each pair. The module provides standard serial ID information compliant with SFP MSA, which can be accessed with address of A0h via the 2wire serial EEPROM protocol. The physical IC can also be accessed via 2wire serial bus at address A0h.

Pin Descriptions



| Pin | Signal Name | Description | Plug Seq. | Notes |
|-----|-------------|---|-----------|---------------|
| 1 | VEET | Transmitter Ground | 1 | |
| 2 | TX FAULT | Transmitter Fault Indication | 3 | Not supported |
| 3 | TX DISABLE | Transmitter Disable | 3 | |
| 4 | SDA | SDA Serial Data Signal | 3 | |
| 5 | SCL | SCL Serial Clock Signal | 3 | |
| 6 | MOD_ABS | Module Absent. Grounded within the module | 3 | |
| 7 | RS0 | Not Connected | 3 | |
| 8 | LOS | Loss of Signal | 3 | Not supported |
| 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 Supply | 2 | |
| 16 | VCCT | Transmitter Power Supply | 2 | |
| 17 | VEET | Transmitter Ground | 1 | |
| 18 | TD+ | Transmit Data In | 3 | |
| 19 | TD- | Inv. Transmit Data In | 3 | |
| 20 | VEET | Transmitter Ground | 1 | |

+3.3V Volt Electrical Power Interface

The GLC-TE has an input voltage range of +3.3V +/- 5%. The 3.3V maximum voltage is not allowed for continuous operation.

Table 1. +3.3V Volt electrical power interface

| +3.3V volt Electrical Power Interface | | | | | | |
|---------------------------------------|--------|------|-----|------|-------|---|
| Parameter | Symbol | Min | Typ | Max | Units | Notes/Conditions |
| Supply Current | Is | | 320 | 375 | mA | 1.2W max power over full range of voltage and temperature. See caution note below |
| Input Voltage | Vcc | 3.13 | 3.3 | 3.47 | V | Referenced to GND |
| Maximum Voltage | Vmax | | | 4 | V | |
| Surge Current | Isurge | | | 30 | 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 GBIC MSA

Low-Speed Signals

MOD_DEF(1) (SCL) and MOD_DEF(2) (SDA), are open drain CMOS signals (see section VII, “Serial Communication Protocol”). Both MOD_DEF(1) and MOD_DEF(2) must be pulled up to Host_Vcc.

Table 2. Low-speed signals, electronic characteristics

| Low-Speed Signals, Electronic Characteristics | | | | | |
|---|--------|----------------|----------------|-------|---|
| Parameter | Symbol | Min | Max | Units | Notes/Conditions |
| GBIC Output LOW | VOL | 0 | 0.5 | V | 4.7k to 10k pull-up to host_Vcc, measured at host side of connector |
| GBIC 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 |
| GBIC Input LOW | VIL | 0 | 0.8 | V | 4.7k to 10k pull-up to Vcc, measured at GBIC side of connector |
| GBIC Input HIGH | VIH | 2 | Vcc + 0.3 | V | 4.7k to 10k pull-up to Vcc, measured at GBIC side of connector |

High-Speed Electrical Interface

All high-speed signals are AC-coupled internally.

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

| High-Speed Electrical Interface Transmission Line-GBIC | | | | | | |
|--|---------|-----|-----|-----|-------|---|
| Parameter | Symbol | Min | Typ | Max | Units | Notes/Conditions |
| Line Frequency | fL | | 125 | | 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 |

High-speed electrical interface, host-GBIC

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

| High-Speed Electrical Interface, Host-GBIC | | | | | | |
|--|----------|-----|-----|------|-------|------------------|
| 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 |

General Specifications

Table 5. General specifications

| General | | | | | | |
|--------------|--------|-----|-----|-------|--------|--|
| Parameter | Symbol | Min | Typ | Max | Units | Notes/Conditions |
| Data Rate | BR | 10 | | 1,000 | Mb/sec | IEEE 802.3 compatible. See Notes 2 through 4 below |
| Cable Length | L | | | 100 | m | Category 5 UTP. BER <10-12 |

Notes:

1. Clock tolerance is +/- 50 ppm
2. By default, the module is a full duplex device in preferred master mode
3. Automatic crossover detection is enabled. External crossover cable is not required
4. 1000 BASE-T operation requires the host system to have an SGMII interface with no clocks, and the module PHY to be configured per Application Note. With a SERDES that does not support SGMII, the module will operate at 1000BASE-T only.

Environmental Specifications

Table 6. Environmental specifications

| Environmental Specifications | | | | | | |
|------------------------------|--------|-----|-----|-----|-------|---------------------|
| Parameter | Symbol | Min | Typ | Max | Units | Notes/Conditions |
| Operating Temperature | Top | 0 | | 70 | °C | Case temperature |
| | | -40 | | 85 | | Case temperature |
| Storage Temperature | Tsto | -40 | | 85 | °C | Ambient temperature |

References

1. Gigabit Interface Converter (GBIC) Transceiver Multi-Source Agreement (MSA),
2. IEEE Std 802.3, 2002 Edition. IEEE Standards Department, 2002.
3. "AT24C01A/02/04/08/16 2-Wire Serial EEPROM", Atmel Corporation.
4. "Alaska Ultra 88E1111 Integrated 10/100/1000 Gigabit Ethernet Transceiver", Marvell Corporation.

Mechanical Specifications

