

Gigabit Interface Converters Transceiver Module for Gigabit Ethernet

FEATURES

- Compliant with IEEE802.3z/D2 Gigabit Ethernet (1000BASE-LX) Specification
- Giga-bit Inetrface Converter(GBIC) Revision 5.4 compliant [4]
- Data Link up to 10km (GBIC-1250B4Q) on Single Mode Fiber.
- Single + 3.3V Power Supply, Tx_DISABLE / Tx_FAULT / Rx_LOS TTL Logic
- Hot pluggable
- Laser Class 1 Product (Laser Klasse 1 Product) which comply with the requirements of IEC 60825-1 and IEC 60825-2

Ordering Information

GBIC - 1250 A 3 F S

Data Rate

Mode

A Multimode
B Singlemode

TTL Voltage

3 5V TTL
4 3.3V TTL

EEPROM

Blank w/o EEPROM
S w/i EEPROM

Link Distance

F 500 m
Q 10 km

Absolute Maximum Ratings

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Reference |
|---------------------|--------|------|------|------|------|-----------|
| Storage temperature | Ts | -40 | | 85 | °C | |
| Supply voltage | Vcc | 0 | | 6 | V | |

Recommended Operating Conditions:

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Reference |
|--|-----------------------------------|--------|------|--------|------|-----------|
| Ambient Operating Temperature | T _A | -40 | | 85 | °C | |
| Supply voltage | V _{CC} | 3.135 | | 3.465 | V | |
| Transmitter Data input voltage-Low | V _{IL} - V _{CC} | -1.810 | | -1.475 | V | |
| Transmitter Data input voltage-High | V _{IH} - V _{CC} | -1.165 | | -0.880 | V | |
| Transmitter Differential Input Voltage | V _D | | | 2 | V | |
| Data Output Load | R _{DL} | | 75 | | Ω | |



DELTA ELECTRONICS, INC.

TITLE

GBIC-1250B4QS

DATE:

03/13/02'

WRITTEN

Anna.Huang

CHECKED

Jason.Wang

APPROVED

Teddy.Kuo

DOCUMENT NO:

REV:

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Gigabit Interface Converters Transceiver Module for

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Transmitter Electro-Optical Performance Specifications:

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Reference |
|--------------------------------------|-----------------|------|------|------|--------|-----------|
| Supply current | I _{cc} | | | 160 | mA | |
| Launched power(avg.) GBIC-1250B4Q | P _O | -9.5 | | -3 | dBm | Note(1) |
| Optical extinction ratio | | 9 | | | dB | Note(1) |
| Center wavelength | λ_c | 1274 | 1310 | 1355 | nm | |
| Spectral width(RMS) | σ | | | 4 | nm rms | |
| Relative Intensity Noise | RIN | | | -120 | dB/Hz | |


Note(1).The maximum optical output power complies with the IEEE 802.3z/D2 specification, and is class 1 laser eye safe.

Receiver Electro-Optical Performance Specifications:

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Reference |
|---------------------------------|-----------------------------------|--------|------|--------|-----------------|-----------|
| Supply current | I _{cc} | | | 130 | mA | |
| Data output voltage-Low | V _{OL} - V _{CC} | -1.950 | | -1.620 | V _{CC} | |
| Data output voltage-High | V _{OH} - V _{CC} | -1.045 | | -0.740 | V _{CC} | |
| Optical input sensitivity(avg.) | P _{IN} | | | -19 | dBm | Note(1) |
| Optical input saturation(avg.) | P _{SAT} | -3 | | | dBm | |
| Optical wavelength | λ | | 1310 | | nm | |
| Output Data risetime | t _r | | | 0.4 | ns | Note(2) |
| Output Data falltime | t _f | | | 0.4 | ns | Note(2) |
| Signal detect-Assert | P _A | | | -20 | dBm | |
| Signal detect-Deassert | P _D | -35 | | | dBm | |
| Signal detect-Hysteresis | P _A -P _D | 2 | | | dB | |

Note(1).With BER better than or equal to 1×10^{-12} , measured in the center of the eye opening with 2⁷-1 NRZ PRBS

Note(2).These are 20%~80% values

| | | | | | | |
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Gigabit Interface Converters Transceiver Module for Gigabit Ethernet

GBIC to host connector pin assignment

| 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 |

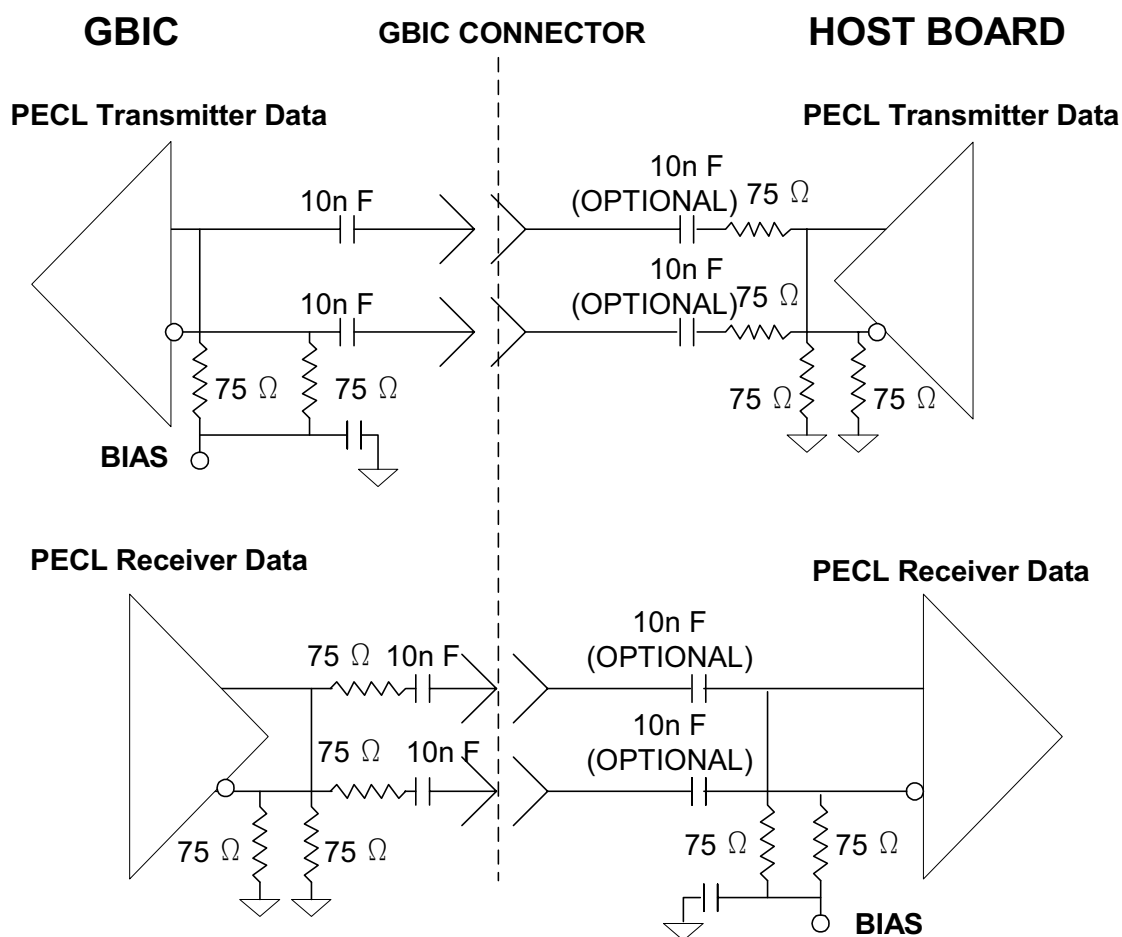
Overview of internal interface signal Definition


| 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 +3.3 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 pull up 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 +3.3 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, 4.7 K to 10 K Ohm pull up to VDDT on GBIC | Low speed, to GBIC |
| TX_FAULT | 10 | Transmitter Fault, logic high, open collector compatible, 4.7 K to 10 K Ohm pull up 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 pull up 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 pull up 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 pull up to VDDT on host | Low speed, from GBIC |

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Recommended Circuit Schematic :



| | | | | | |
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GBIC module definition parameters :

| Module Definition | MOD_DEF(0) pin 4 | MOD_DEF(1) pin 5 | MOD_DEF(2) pin 6 | Interpretation by host Reference |
|-------------------|---------------------|---------------------|---------------------|---|
| 0 | NC | NC | NC | GBIC not present clause |
| 1 | NC | NC | TTL LOW | Copper Style 1 or Style 2 connector, 1.0625 Gbd, 100-TW-EL-S or 100-TP-EL-S, active inter-enclosure connection. and IEEE802.3 1000BASE-CX |
| 2 | NC | TTL LOW | NC | Copper Style 1 or Style 2 connector, 1.0625 Gbd, 100-TW-EL-S, or 100-TP-EL-S, active or passive intraenclosure connection |
| 3 | NC | TTL LOW | TTL LOW | Optical LW, 1.0625 Gbd 100-SM-LC-L |
| 4 | TTL LOW | SCL | SDA | Serial module definition protocol |
| 5 | TTL LOW | NC | TTL LOW | Optical SW, 1.0625 Gbd 100-M5-SN-I or 100-M6-SN-I |
| 6 | TTL LOW | TTL LOW | NC | Optical LW, 1.0625 Gbd 100-SM-LC-L and similar to 1.25 Gbd IEEE802.3z 1000BASE-LX, single mode |
| 7 | TTL LOW | TTL LOW | TTL LOW | Optical SW, 1.0625 Gbd 100-M5-SN-I or 100-M6-SN-I and 1.25 Gbd, IEEE 802.3z, 1000BASE-SX |

GBIC timing parameters for GBIC management

| Parameter | Symbol | Min. | Max. | Unit | Unit Conditions |
|--|------------|------|------|------|---|
| TX_DISABLE assert time | t_off | | 10 | μsec | rising edge of TX_DISABLE to fall of output signal below 10% of nominal |
| TX_DISABLE negate time | t_on | | 1 | mec | Falling edge of TX_DISABLE to rise of output signal above 90% of nominal |
| Time to initialize, includes reset of TX_FAULT | t_init | | 300 | msec | From power on or hot plug after V DD T > 3.0 volts or From negation of TX_DISABLE during reset of TX_FAULT. |
| TX_FAULT from fault to assertion | t_fault | | 100 | μsec | From occurrence of fault (output safety violation or V DD T < 3.0 volts) |
| TX_DISABLE time to start reset | t_rest | 10 | | μsec | TX_DISABLE HIGH before TX_DISABLE set LOW |
| RX_LOS assert delay | t_loss_on | | 100 | μsec | From detection of loss of signal to assertion of RX_LOS |
| RX_LOS negate delay | t_loss_off | | 100 | μsec | From detection of presence of signal to negation of RX_LOS |

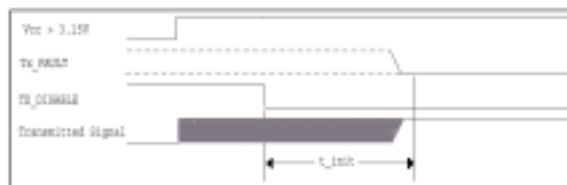
| | | | | | |
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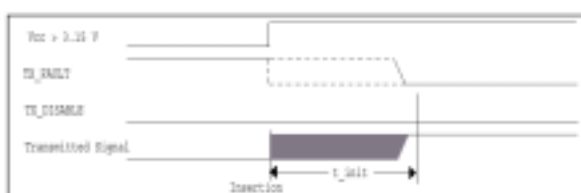
GBIC timing parameters :



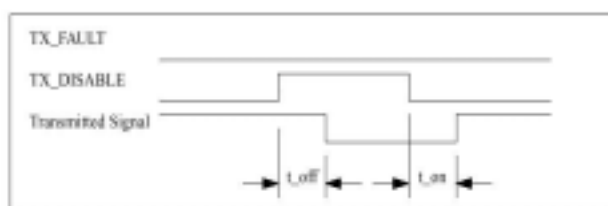
Power on initialization of GBIC, TX_DISABLE negated



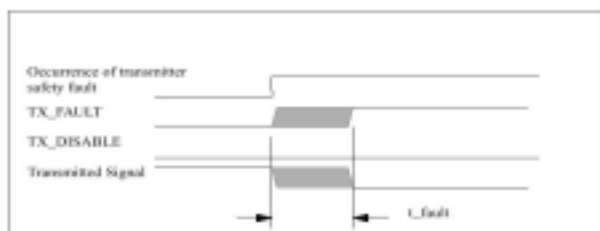
Power on initialization of GBIC, TX_DISABLE asserted



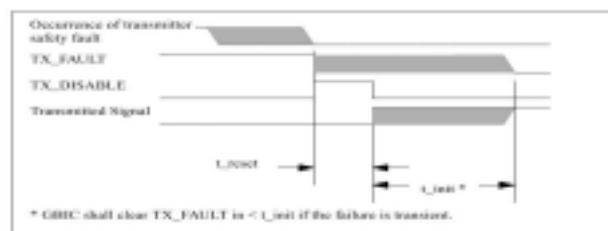
Example of initialization during hot plugging, TX_DISABLE negated



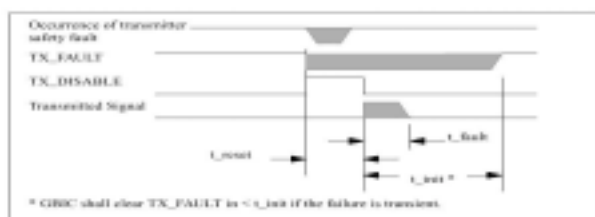
Management of GBIC during normal operation, TX_DISABLE implemented



Detection of transmitter safety fault condition



Successful recovery from transient safety fault condition



Unsuccessful recovery from safety fault condition



Timing of RX_LOS detection



| | | | | | |
|---------------|------------|-----------|--------------|-----------|--|
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Gigabit Interface Converters Transceiver Module for Gigabit Ethernet

Serial ID Identification

A GBIC having module definition 4 provides access to sophisticated identification information that describes the GBIC's capabilities, standard interfaces, manufacturer, and other information. The serial interface uses the 2-wire serial CMOS E 2 PROM protocol defined for the ATMEL AT24C 01A/02/04 family of components (see 5.2.1). The memories are organized as a series of 8-bit data words that can be addressed individually or sequentially.

| Data Address | Field Size (Bytes) | Name of field | Description of field |
|----------------------------------|--------------------|-----------------|--|
| BASE OF FIELDS | | | |
| 0 | 1 | Identifier | Type of serial transceiver (see table D.2) |
| 1 | 1 | Ext. Identifier | Extended identifier of type of serial transceiver (See table D.3) |
| 2 | 1 | Connector | Code for connector type (see table D.4) |
| 3-10 | 8 | Transceiver | Code for electronic compatibility or optical compatibility (see table D.5) |
| 11 | 1 | Encoding | Code for serial encoding algorithm (see table D.6) |
| 12 | 1 | BR, Nominal | Nominal bit rate, units of 100 Mbits/sec. |
| 13-14 | 2 | Reserved | |
| 15 | 1 | Length (9μ) | Link length supported for 9/125 mm fiber, units of 100 m |
| 16 | 1 | Length (50μ) | Link length supported for 50/125 mm fiber, units of 10 m |
| 17 | 1 | Length (62.5μ) | Link length supported for 62.5/125 mm fiber, units of 10 m |
| 18 | 1 | Length (Copper) | Link length supported for copper, units of meters |
| 19 | 1 | Reserved | |
| 20-35 | 16 | Vendor name | GBIC vendor name (ASCII) |
| 36 | 1 | Reserved | |
| 37-39 | 3 | Vendor OUI | GBIC vendor IEEE company ID |
| 40-55 | 16 | Vendor PN | Part number provided by GBIC vendor (ASCII) |
| 56-59 | 4 | Vendor rev | Revision level for part number provided by vendor (ASCII) |
| 60-62 | 3 | Reserved | |
| 63 | 1 | CC BASE | Check code for Base ID Fields (addresses 0 to 62) |
| EXTENDED ID FIELDS | | | |
| 64-65 | 2 | Options | Indicates which optional GBIC signals are implemented (see table D.7) |
| 66 | 1 | BR, max | Upper bit rate margin, units of % |
| 67 | 1 | BR, min | Lower bit rate margin, units of % |
| 68-83 | 16 | Vendor SN | Serial number provided by vendor (ASCII) |
| 84-91 | 8 | Date code | Vendor's manufacturing date code (see table D.8) |
| 92-94 | 3 | Reserved | |
| 95 | 1 | CC EXT | Check code for the Extended ID Fields (addresses 64 to 94) |
| VENDOR SPECIFIC ID FIELDS | | | |
| 96-127 | 32 | Read-only | Vendor specific data, read only |
| 128-511 | 384 | Reserved | |
| 512-n | | | Vendor specific |

Table D.1 : Serial ID Data Field

| | | | | | |
|---|---------------|------------|-----------|--------------|------|
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Identifier

The identifier value specifies the physical device described by the serial information. This value shall be included in the serial data. The defined identifier values are shown in **table D.2**.

| Value | Description of physical device |
|--------|--|
| 00h | Unknown or unspecified |
| 01h | GBIC |
| 02h | Module/connector soldered to motherboard |
| 03-7Fh | Reserved |
| 80-FFh | Vendor specific |


Table D.2 : Identifier values

Extended Identifier

The extended identifier value provides additional information about the transceiver. At present, extended identifier values are specified only for the identifier value of 01h (GBIC). The Extended Identifier value is reserved for all other identifier values. The defined extended identifier values for the GBIC are shown in **table D.3**.

| Value | Description of physical device |
|--------|---|
| 00h | GBIC definition is not specified or the GBIC definition is not compliant with a defined MOD_DEF. See product specification for details. |
| 01h | GBIC is compliant with MOD_DEF 1 |
| 02h | GBIC is compliant with MOD_DEF 2 |
| 03h | GBIC is compliant with MOD_DEF 3 |
| 04h | GBIC function is defined by serial ID only |
| 05h | GBIC is compliant with MOD_DEF 5 |
| 06-7Fh | Reserved |
| 80-FFh | Vendor specific |

**Table D.3 : Extended Identifier values
for Identifier 01h (GBIC)**

| | | | | | |
|--|------------------------|------------|-----------|--------------------|------------|
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Gigabit Interface Converters Transceiver Module for Gigabit Ethernet

Connector

The Connector value indicates the external connector provided on the interface. This value shall be included in the serial data. The defined connector values are shown in **table D.4**.

| Value | Description of physical device |
|---------|--|
| 00h | Unknown or unspecified |
| 01h | Fibre Channel definition of SC connector |
| 02h | Fibre Channel definition of style 1 copper connector |
| 03h | Fibre Channel definition of style 2 copper connector |
| 04h | Fibre Channel definition of BNC/TNC |
| 05h | Fibre Channel definition of coaxial headers |
| 06h-7Fh | Reserved |
| 05h-FFh | Vendor specific |

Table D.4 : Connector values

| | | | | | |
|---|---------------|------------|-----------|--------------|------|
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Gigabit Interface Converters Transceiver Module for Gigabit Ethernet


Transceiver

The following bit significant indicators define the electronic or optical interfaces that are supported by the GBIC. At least one bit shall be set in this field. For Fibre Channel GBICs, the Fibre Channel speed, transmission media, transmitter technology, and distance capability shall all be indicated. The defined transceiver values are shown in **table D.5**.

| Data Addr | Bit | Description of transceiver | Data Addr | Bit | Description of transceiver |
|------------------------------------|-----|---------------------------------------|--------------------------------------|-----|---------------------------------|
| Reserved Standard Compliance Codes | | | Fibre Channel link length | | |
| 3 | 7-0 | Reserved | 7 | 7 | Reserved |
| 4 | 7-0 | Reserved | 7 | 6 | short distance (S) |
| SONET Compliance Codes | | | 7 | 5 | intermediate distance (I) |
| 5 | 7 | Reserved | 7 | 4 | long distance (L) |
| 5 | 6 | OC 12, single mode long reach | Fibre Channel transmitter technology | | |
| 5 | 5 | OC 12, single mode intermediate reach | 7 | 3-2 | Reserved |
| 5 | 4 | OC 12 multi-mode short reach | 7 | 1 | Longwave laser (LC) |
| 5 | 3 | Reserved | 7 | 0 | Electrical inter-enclosure (EL) |
| 5 | 2 | OC 3, single mode long reach | 8 | 7 | Electrical intra-enclosure (EL) |
| 5 | 1 | OC 3, single mode intermediate reach | 8 | 6 | Shortwave laser w/o OFC (SN) |
| 5 | 0 | OC 3, multi-mode short reach | 8 | 5 | Shortwave laser w/ OFC (SL) |
| Gigabit Ethernet Compliance Codes | | | 8 | 4 | |
| 6 | 7-4 | Reserved | Fibre Channel transmission media | | |
| 6 | 3 | 1000BASE-T 8 0-3 Reserved | 8 | 0-3 | Reserved |
| 6 | 2 | 1000BASE-CX | 9 | 7 | Twin Axial Pair (TW) |
| 6 | 1 | 1000BASE-LX | 9 | 6 | Shielded Twisted Pair (TP) |
| 6 | 0 | 1000BASE-SX | 9 | 5 | Miniature Coax (MI) |
| | | | 9 | 4 | Video Coax (TV) |
| | | | 9 | 3 | Multi-mode, 62.5μ (M6) |
| | | | 9 | 2 | Multi-mode, 50 μ (M5) |
| | | | 9 | 1 | Reserved |
| | | | 9 | 0 | Single Mode (SM) |
| | | | Fibre Channel speed | | |
| | | | 10 | 7-5 | Reserved |
| | | | 10 | 4 | 400 MBytes/Sec |
| | | | 10 | 3 | Reserved |
| | | | 10 | 2 | 200 MBytes./Sec |
| | | | 10 | 1 | Reserved |
| | | | 10 | 0 | 100 MBytes./Sec |

a. Bit 7 is the high order bit and is transmitted first in each byte.


Table D.5: Transceiver codes

| | | | | | | |
|---|---------------|------------|-----------|--------------|-----------|------|
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Gigabit Interface Converters Transceiver Module for Gigabit Ethernet

GBIC Serial ID Memory(0203D00002)


| D/A | Data | D/A | Data | D/A | Data | D/A | Data | D/A | Data | D/Ar | Data |
|-----|------|-----|------|-----|------|-----|------|-----|------|------|------|
| 00 | 01 | 25 | 20 | 50 | 34 4 | 75 | 32 2 | 100 | 20 | 125 | 20 |
| 01 | 04 | 26 | 20 | 51 | 51 Q | 76 | 30 0 | 101 | 20 | 126 | 20 |
| 02 | 01 | 27 | 20 | 52 | 53 S | 77 | 33 3 | 102 | 20 | 127 | 20 |
| 03 | 00 | 28 | 20 | 53 | 20 | 78 | 34 4 | 103 | 20 | 128 | 20 |
| 04 | 00 | 29 | 20 | 54 | 20 | 79 | 30 0 | 104 | 20 | | |
| 05 | 00 | 30 | 20 | 55 | 20 | 80 | 30 0 | 105 | 20 | | |
| 06 | 02 | 31 | 20 | 56 | 30 | 81 | 30 0 | 106 | 20 | | |
| 07 | 12 | 32 | 20 | 57 | 30 | 82 | 30 0 | 107 | 20 | | |
| 08 | 00 | 33 | 20 | 58 | 30 | 83 | 32 2 | 108 | 20 | | |
| 09 | 01 | 34 | 20 | 59 | 30 | 84 | 30 0 | 109 | 20 | | |
| 10 | 01 | 35 | 20 | 60 | 00 | 85 | 32 2 | 110 | 20 | | |
| 11 | 01 | 36 | 00 | 61 | 00 | 86 | 30 0 | 111 | 20 | | |
| 12 | 0D | 37 | 00 | 62 | 00 | 87 | 33 3 | 112 | 20 | | |
| 13 | 00 | 38 | 00 | 63 | 0A | 88 | 30 0 | 113 | 20 | | |
| 14 | 00 | 39 | 00 | 64 | 00 | 89 | 30 0 | 114 | 20 | | |
| 15 | 64 | 40 | 47 G | 65 | 1A | 90 | 30 0 | 115 | 20 | | |
| 16 | 37 | 41 | 42 B | 66 | 05 | 91 | 30 0 | 116 | 20 | | |
| 17 | 37 | 42 | 49 I | 67 | 05 | 92 | 00 | 117 | 20 | | |
| 18 | 00 | 43 | 43 C | 68 | 30 | 93 | 00 | 118 | 20 | | |
| 19 | 00 | 44 | 2D - | 69 | 30 | 94 | 00 | 119 | 20 | | |
| 20 | 44 D | 45 | 31 1 | 70 | 30 | 95 | B4 | 120 | 20 | | |
| 21 | 45 E | 46 | 32 2 | 71 | 30 | 96 | 20 | 121 | 20 | | |
| 22 | 4C L | 47 | 35 5 | 72 | 30 | 97 | 20 | 122 | 20 | | |
| 23 | 54 T | 48 | 30 0 | 73 | 30 | 98 | 20 | 123 | 20 | | |
| 24 | 41 A | 49 | 42 B | 74 | 30 0 | 99 | 20 | 124 | 20 | | |

| | | | | | | |
|---|---------------|------------|-----------|--------------|-----------|------|
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GBIC Serial ID Memory(0203D00003)


| D/A | Data | D/A | Data | D/A | Data | D/A | Data | D/A | Data | D/Ar | Data |
|-----|------|-----|------|-----|------|-----|------|-----|------|------|------|
| 00 | 01 | 25 | 20 | 50 | 34 4 | 75 | 32 2 | 100 | 20 | 125 | 20 |
| 01 | 04 | 26 | 20 | 51 | 51 Q | 76 | 30 0 | 101 | 20 | 126 | 20 |
| 02 | 01 | 27 | 20 | 52 | 53 S | 77 | 33 3 | 102 | 20 | 127 | 20 |
| 03 | 00 | 28 | 20 | 53 | 20 | 78 | 34 4 | 103 | 20 | 128 | 20 |
| 04 | 00 | 29 | 20 | 54 | 20 | 79 | 30 0 | 104 | 20 | | |
| 05 | 00 | 30 | 20 | 55 | 20 | 80 | 30 0 | 105 | 20 | | |
| 06 | 02 | 31 | 20 | 56 | 30 | 81 | 30 0 | 106 | 20 | | |
| 07 | 12 | 32 | 20 | 57 | 30 | 82 | 30 0 | 107 | 20 | | |
| 08 | 00 | 33 | 20 | 58 | 30 | 83 | 33 3 | 108 | 20 | | |
| 09 | 01 | 34 | 20 | 59 | 30 | 84 | 30 0 | 109 | 20 | | |
| 10 | 01 | 35 | 20 | 60 | 00 | 85 | 32 2 | 110 | 20 | | |
| 11 | 01 | 36 | 00 | 61 | 00 | 86 | 30 0 | 111 | 20 | | |
| 12 | 0D | 37 | 00 | 62 | 00 | 87 | 33 3 | 112 | 20 | | |
| 13 | 00 | 38 | 00 | 63 | 0A | 88 | 30 0 | 113 | 20 | | |
| 14 | 00 | 39 | 00 | 64 | 00 | 89 | 30 0 | 114 | 20 | | |
| 15 | 64 | 40 | 47 G | 65 | 1A | 90 | 30 0 | 115 | 20 | | |
| 16 | 37 | 41 | 42 B | 66 | 05 | 91 | 30 0 | 116 | 20 | | |
| 17 | 37 | 42 | 49 I | 67 | 05 | 92 | 00 | 117 | 20 | | |
| 18 | 00 | 43 | 43 C | 68 | 30 | 93 | 00 | 118 | 20 | | |
| 19 | 00 | 44 | 2D - | 69 | 30 | 94 | 00 | 119 | 20 | | |
| 20 | 44 D | 45 | 31 1 | 70 | 30 | 95 | B5 | 120 | 20 | | |
| 21 | 45 E | 46 | 32 2 | 71 | 30 | 96 | 20 | 121 | 20 | | |
| 22 | 4C L | 47 | 35 5 | 72 | 30 | 97 | 20 | 122 | 20 | | |
| 23 | 54 T | 48 | 30 0 | 73 | 30 | 98 | 20 | 123 | 20 | | |
| 24 | 41 A | 49 | 42 B | 74 | 30 0 | 99 | 20 | 124 | 20 | | |

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|---|---------------|------------|-----------|--------------|-----------|------|
|  DELTA ELECTRONICS, INC. | TITLE | | | | DATE: | |
| | GBIC-1250B4QS | | | | 03/13/02' | |
| | WRITTEN | CHECKED | APPROVED | DOCUMENT NO: | | REV: |
| | Anna.Huang | Jason.Wang | Teddy.Kuo | | | S2 |

Gigabit Interface Converters Transceiver Module for Gigabit Ethernet

GBIC Serial ID Memory(0203D00004)


| D/A | Data | D/A | Data | D/A | Data | D/A | Data | D/A | Data | D/Ar | Data |
|-----|------|-----|------|-----|------|-----|------|-----|------|------|------|
| 00 | 01 | 25 | 20 | 50 | 34 4 | 75 | 32 2 | 100 | 20 | 125 | 20 |
| 01 | 04 | 26 | 20 | 51 | 51 Q | 76 | 30 0 | 101 | 20 | 126 | 20 |
| 02 | 01 | 27 | 20 | 52 | 53 S | 77 | 33 3 | 102 | 20 | 127 | 20 |
| 03 | 00 | 28 | 20 | 53 | 20 | 78 | 34 4 | 103 | 20 | 128 | 20 |
| 04 | 00 | 29 | 20 | 54 | 20 | 79 | 30 0 | 104 | 20 | | |
| 05 | 00 | 30 | 20 | 55 | 20 | 80 | 30 0 | 105 | 20 | | |
| 06 | 02 | 31 | 20 | 56 | 30 | 81 | 30 0 | 106 | 20 | | |
| 07 | 12 | 32 | 20 | 57 | 30 | 82 | 30 0 | 107 | 20 | | |
| 08 | 00 | 33 | 20 | 58 | 30 | 83 | 34 4 | 108 | 20 | | |
| 09 | 01 | 34 | 20 | 59 | 30 | 84 | 30 0 | 109 | 20 | | |
| 10 | 01 | 35 | 20 | 60 | 00 | 85 | 32 2 | 110 | 20 | | |
| 11 | 01 | 36 | 00 | 61 | 00 | 86 | 30 0 | 111 | 20 | | |
| 12 | 0D | 37 | 00 | 62 | 00 | 87 | 33 3 | 112 | 20 | | |
| 13 | 00 | 38 | 00 | 63 | 0A | 88 | 30 0 | 113 | 20 | | |
| 14 | 00 | 39 | 00 | 64 | 00 | 89 | 30 0 | 114 | 20 | | |
| 15 | 64 | 40 | 47 G | 65 | 1A | 90 | 30 0 | 115 | 20 | | |
| 16 | 37 | 41 | 42 B | 66 | 05 | 91 | 30 0 | 116 | 20 | | |
| 17 | 37 | 42 | 49 I | 67 | 05 | 92 | 00 | 117 | 20 | | |
| 18 | 00 | 43 | 43 C | 68 | 30 | 93 | 00 | 118 | 20 | | |
| 19 | 00 | 44 | 2D - | 69 | 30 | 94 | 00 | 119 | 20 | | |
| 20 | 44 D | 45 | 31 1 | 70 | 30 | 95 | B6 | 120 | 20 | | |
| 21 | 45 E | 46 | 32 2 | 71 | 30 | 96 | 20 | 121 | 20 | | |
| 22 | 4C L | 47 | 35 5 | 72 | 30 | 97 | 20 | 122 | 20 | | |
| 23 | 54 T | 48 | 30 0 | 73 | 30 | 98 | 20 | 123 | 20 | | |
| 24 | 41 A | 49 | 42 B | 74 | 30 0 | 99 | 20 | 124 | 20 | | |

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|  DELTA ELECTRONICS, INC. | TITLE | | | | DATE: | |
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| | WRITTEN | CHECKED | APPROVED | DOCUMENT NO: | | REV: |
| | Anna.Huang | Jason.Wang | Teddy.Kuo | | | S2 |

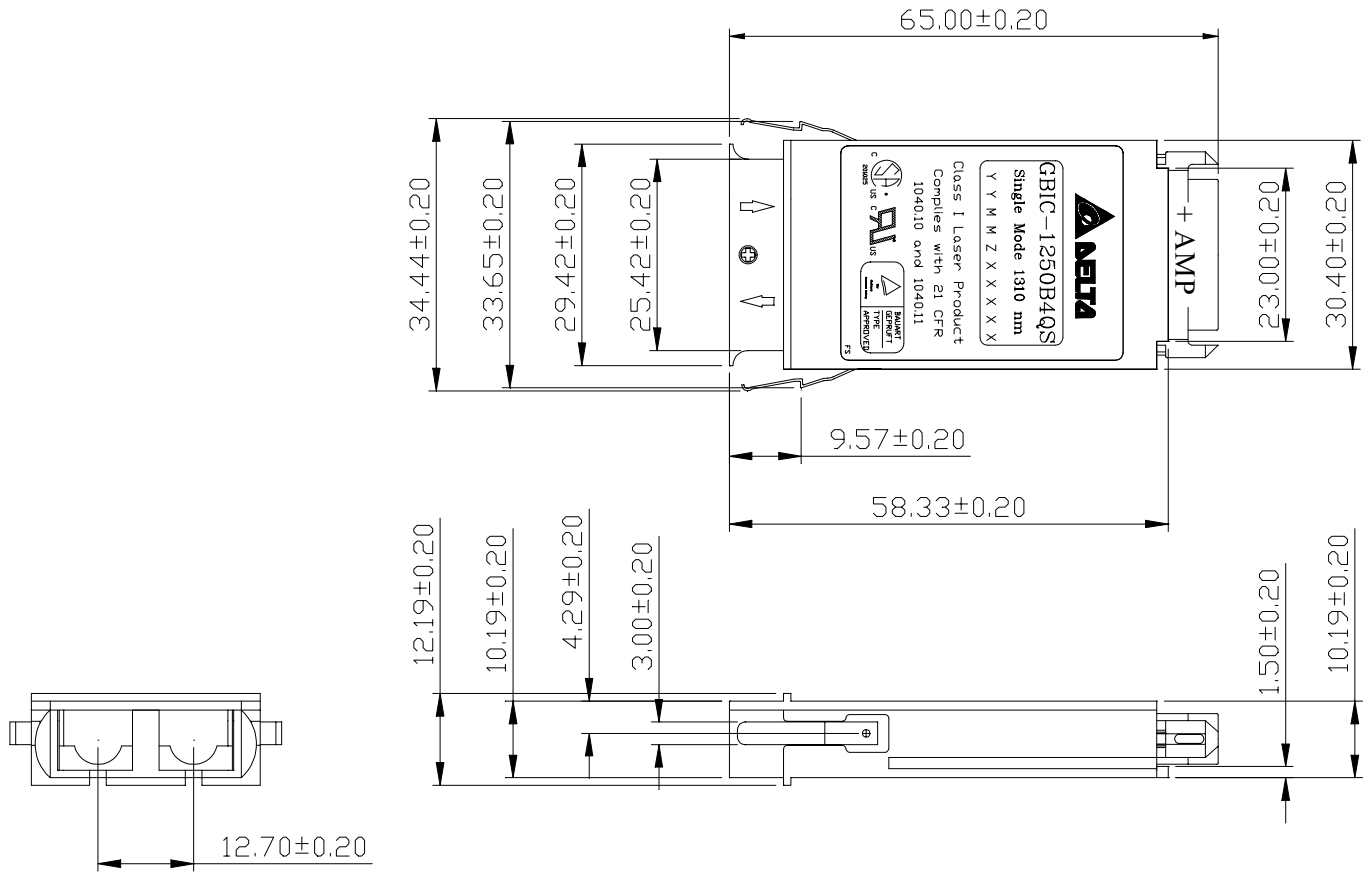
Gigabit Interface Converters Transceiver Module for Gigabit Ethernet


GBIC Serial ID Memory(0203D00005)

| D/A | Data | D/A | Data | D/A | Data | D/A | Data | D/A | Data | D/Ar | Data |
|-----|------|-----|------|-----|------|-----|------|-----|------|------|------|
| 00 | 01 | 25 | 20 | 50 | 34 4 | 75 | 32 2 | 100 | 20 | 125 | 20 |
| 01 | 04 | 26 | 20 | 51 | 51 Q | 76 | 30 0 | 101 | 20 | 126 | 20 |
| 02 | 01 | 27 | 20 | 52 | 53 S | 77 | 33 3 | 102 | 20 | 127 | 20 |
| 03 | 00 | 28 | 20 | 53 | 20 | 78 | 34 4 | 103 | 20 | 128 | 20 |
| 04 | 00 | 29 | 20 | 54 | 20 | 79 | 30 0 | 104 | 20 | | |
| 05 | 00 | 30 | 20 | 55 | 20 | 80 | 30 0 | 105 | 20 | | |
| 06 | 02 | 31 | 20 | 56 | 30 | 81 | 30 0 | 106 | 20 | | |
| 07 | 12 | 32 | 20 | 57 | 30 | 82 | 30 0 | 107 | 20 | | |
| 08 | 00 | 33 | 20 | 58 | 30 | 83 | 31 5 | 108 | 20 | | |
| 09 | 01 | 34 | 20 | 59 | 30 | 84 | 30 0 | 109 | 20 | | |
| 10 | 01 | 35 | 20 | 60 | 00 | 85 | 32 2 | 110 | 20 | | |
| 11 | 01 | 36 | 00 | 61 | 00 | 86 | 30 0 | 111 | 20 | | |
| 12 | 0D | 37 | 00 | 62 | 00 | 87 | 33 3 | 112 | 20 | | |
| 13 | 00 | 38 | 00 | 63 | 0A | 88 | 30 0 | 113 | 20 | | |
| 14 | 00 | 39 | 00 | 64 | 00 | 89 | 30 0 | 114 | 20 | | |
| 15 | 64 | 40 | 47 G | 65 | 1A | 90 | 30 0 | 115 | 20 | | |
| 16 | 37 | 41 | 42 B | 66 | 05 | 91 | 30 0 | 116 | 20 | | |
| 17 | 37 | 42 | 49 I | 67 | 05 | 92 | 00 | 117 | 20 | | |
| 18 | 00 | 43 | 43 C | 68 | 30 | 93 | 00 | 118 | 20 | | |
| 19 | 00 | 44 | 2D - | 69 | 30 | 94 | 00 | 119 | 20 | | |
| 20 | 44 D | 45 | 31 1 | 70 | 30 | 95 | B7 | 120 | 20 | | |
| 21 | 45 E | 46 | 32 2 | 71 | 30 | 96 | 20 | 121 | 20 | | |
| 22 | 4C L | 47 | 35 5 | 72 | 30 | 97 | 20 | 122 | 20 | | |
| 23 | 54 T | 48 | 30 0 | 73 | 30 | 98 | 20 | 123 | 20 | | |
| 24 | 41 A | 49 | 42 B | 74 | 30 0 | 99 | 20 | 124 | 20 | | |

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|---|---------------|------------|-----------|--------------|-----------|------|
|  DELTA ELECTRONICS, INC. | TITLE | | | | DATE: | |
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| | WRITTEN | CHECKED | APPROVED | DOCUMENT NO: | | REV: |
| | Anna.Huang | Jason.Wang | Teddy.Kuo | | | S2 |

Gigabit Interface Converters Transceiver Module for Gigabit Ethernet




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|---|---------------|------------|-----------|--------------|-----------|--|
|  DELTA ELECTRONICS, INC. | TITLE | | | | DATE: | |
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Gigabit Interface Converters Transceiver Module for Gigabit Ethernet

Regulatory Compliance

| Test Item | Reference | Qty' | Evaluation |
|---|--|------|--|
| (#1) Electromagnetic Interference EMI | FCC Class B EN 55022 Class B CISPR 22 | 5 | (1) Satisfied with electrical characteristics of product spec. (2) No physical damage |
| (#2) Immunity : Radio Frequency Electromagnetic Field | EN 61000-4-3 IEC 1000-4-3 | 5 | |
| (#3) Immunity : Electrostatic Discharge to the Duplex SC Receptacle | EN 61000-4-2 IEC 1000-4-2 IEC 801.2 | 5 | |
| (#4) Electrostatic Discharge to the Electrical Pins | MIL-STD-883C Method 3015.4 EIAJ#1988.3.2B Version 2, Machine model | 5 | |

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