

## GBX-XXXX192-E6C

10Gbps XFP Bi-Directional Transceiver, 60km Reach  
1270/1330nm TX / 1330/1270 nm RX

### Features

- ◆ Supports 9.95Gb/s to 10.3Gb/s data rates
- ◆ Hot-pluggable XFP footprint
- ◆ Maximum link length of 60km with SMF
- ◆ 1270/1330nm DFB laser Transmitter and 1330/1270nm APD Receiver
- ◆ XFP MSA package with LC connector
- ◆ No reference clock required
- ◆ Loop Back Support.
- ◆ +3.3V, +1.8V power supply
- ◆ Power dissipation <2W
- ◆ Compatible with RoHS
- ◆ Built-in digital diagnostic functions
- ◆ Temperature range 0 °C to 70 °C



### Applications

- ◆ 10GBASE-ER 10G Ethernet at 10.3125Gbps
- ◆ 10GBASE-EW 10G Ethernet at 9.953Gbps
- ◆ 1200-SM-LL-L 1-0G Fiber Channel at 10.51875Gbps

### Description

Gigalight GBX-XXXX192-E6C is compliant with the IEEE803.3ae 10Gbase-Bx. and transmission distance up to 60km on SMF.

The transceiver module comprises a transmitter with a 1270/1330nm DFB laser transmitter and the receiver section consists of a APD photodiode integrated with a TIA,. Transmitter and receiver are separate within a wide temperature range of 0°C to +70°C and offers optimum heat dissipation and excellent electromagnetic shielding thus enabling high port densities for 10 GbE systems.

## Absolute Maximum Ratings

| Parameter                         | Symbol | Min | Max  | Unit | Ref. |
|-----------------------------------|--------|-----|------|------|------|
| Storage Ambient Temperature Range |        | -40 | +85  | °C   |      |
| Powered case Temperature Range    |        | 0   | +70  | °C   |      |
| Operating Relative Humidity       | RH     |     | 85   | %    |      |
| Supply Voltage Range @3.3V        | Vcc3   | 0   | 3.6  | V    |      |
| Supply Voltage Range @ 1.8V       |        | 0   | 1.98 | V    |      |

Any stress beyond the maximum ratings can result in permanent damage. The device specifications are guaranteed only under the recommended operating conditions.

## Electrical Characteristics

| Parameter                        | Symbol     | Min              | Typ | Max     | Unit | Note |
|----------------------------------|------------|------------------|-----|---------|------|------|
| Operating Case Temperature Range | Tc         | 0                |     | +70     | °C   |      |
| Power Supply Voltage @ 3.3V      | Vcc3       | 3.13             | 3.3 | 3.47    | V    |      |
| Power Supply Voltage @ 1.8V      |            | 1.62             | 1.8 | 1.98    |      |      |
| Module total power               | P          |                  |     | 2       | W    |      |
| <b>Transmitter</b>               |            |                  |     |         |      |      |
| Input differential impedance     | Rin        |                  | 100 |         | Ω    | 1    |
| Differential data input swing    | Vin,pp     | 120              |     | 820     | mV   |      |
| Transmit Disable Voltage         | VD         | 2.0              |     | VCC     | V    |      |
| Transmit Enable Voltage          | VEN        | 0                |     | 0.8     | V    |      |
| Transmit Disable Assert Time     |            |                  |     | 10      | us   |      |
| <b>Receiver</b>                  |            |                  |     |         |      |      |
| Differential data output swing   | Vout,pp    | 340              |     | 850     | mV   |      |
| Data output rise time            | tr         |                  |     | 38      | ps   | 2    |
| Data output fall time            | tf         |                  |     | 38      | ps   | 2    |
| LOS Fault                        | VLOS fault | Vcc – 0.5        |     | VCCHOST | V    | 3    |
| LOS Normal                       | VLOS norm  | GND              |     | GND+0.5 | V    | 3    |
| Power Supply Rejection           | PSR        | See Note 3 below |     |         |      | 4    |

### Notes:

1. After internal AC coupling.
2. 20 – 80 %
3. Loss Of Signal is open collector to be pulled up with a 4.7k – 10kohm resistor to 3.15 – 3.6V. Logic 0 indicates normal operation; logic 1 indicates no signal detected.
4. Per Section 2.7.1. in the XFP MSA Specification.

## Optical Characteristics

| Parameter                               | Symbol           | Min                                       | Typ  | Max  | Unit | Ref. |
|---|------------------|---|------|------|------|------|
| Transmitter                             |                  |   |      |      |      |      |
| Optical output Power                    | P                | 2   |      | 7    | dBm  |      |
| Optical Wavelength                      | $\lambda$        | 1260                                      | 1270 | 1280 | nm   |      |
|   |                  | 1320                                      | 1330 | 1340 |      |      |
| Side Mode Suppression Ratio             | SMSR             | 30  |      |      | dB   |      |
| Optical Extinction Ratio                | ER               | 3.5                                       |      |      | dB   | 1    |
| Average Launch power of OFF transmitter | POFF             | -30                                       |      |      | dBm  |      |
| Tx Jitter                               | Tx <sub>j</sub>  | Compliant with each standard requirements |      |      |      |      |
| Receiver                                |                  |   |      |      |      |      |
| Receiver Sensitivity                    | RSENS            |   |      | -20  | dBm  | 2    |
| Receiver Sensitivity in OMA             | RSENS            |   |      | -18  | dBm  | 2    |
| Maximum Input Power                     | PMAX             |   |      | -7   | dBm  |      |
| Optical Center Wavelength               | $\lambda_C$      | 1320                                      |      | 1340 | nm   |      |
|   |                  | 1260                                      |      | 1280 |      |      |
| LOS De-Assert                           | LOS <sub>D</sub> |   |      | -25  | dBm  |      |
| LOS Assert                              | LOS <sub>A</sub> | -28                                       |      |      | dBm  |      |
| LOS Hysteresis                          |                  | 1   |      | 5    | dB   |      |

Notes:

1, PRBS 2<sup>31</sup>-1 test pattern @10.3125Gbps.

2, PRBS 2<sup>31</sup>-1 test pattern @10.3125Gbps, BER≤10<sup>-12</sup>.

## Pin Descriptions

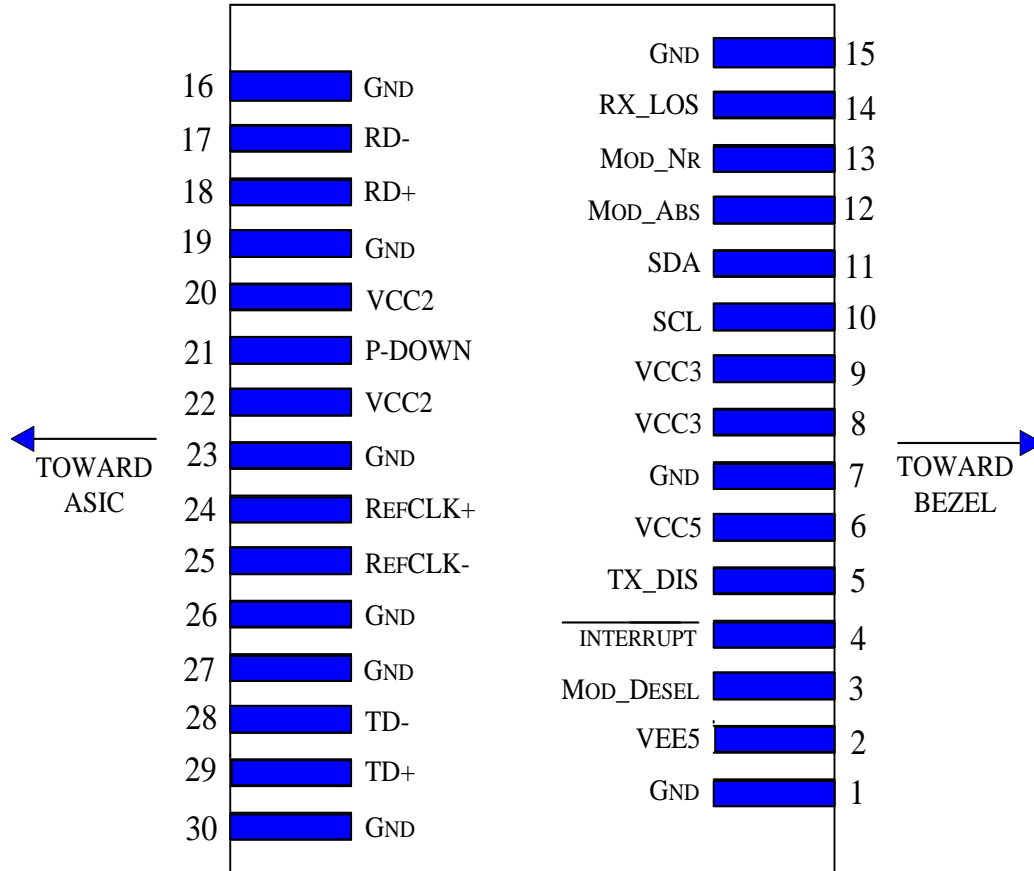
| Pin | Logic    | Symbol    | Name/Description   | Ref |
|-----|----------|-----------|--|-----|
| 1   |          | GND       | Module Ground  | 1   |
| 2   |          | VEE5      | Optional -5.2 Power Supply – <b>Not required</b>   |     |
| 3   | LVTTTL-I | Mod-Desel | Module De-select; When held low allows the module to , respond to 2-wire serial interface commands               |     |
| 4   | LVTTTL-O | Interrupt | Interrupt (bar); Indicates presence of an important condition which can be read over the serial 2-wire interface | 2   |
| 5   | LVTTTL-I | TX_DIS    | Transmitter Disable; Transmitter laser source turned off   |     |
| 6   |          | VCC5      | +5 Power Supply– <b>Not required</b>   |     |
| 7   |          | GND       | Module Ground  | 1   |

|    |           |            |  |   |
|----|-----------|------------|--|---|
| 8  |           | VCC3       | +3.3V Power Supply   |   |
| 9  |           | VCC3       | +3.3V Power Supply   |   |
| 10 | LVTTL-I   | SCL        | Serial 2-wire interface clock  | 2 |
| 11 | LVTTL-I/O | SDA        | Serial 2-wire interface data line  | 2 |
| 12 | LVTTL-O   | Mod_Abs    | Module Absent; Indicates module is not present. Grounded in the module.  | 2 |
| 13 | LVTTL-O   | Mod_NR     | Module Not Ready;  | 2 |
| 14 | LVTTL-O   | RX_LOS     | Receiver Loss of Signal indicator  | 2 |
| 15 |           | GND        | Module Ground  | 1 |
| 16 |           | GND        | Module Ground  | 1 |
| 17 | CML-O     | RD-        | Receiver inverted data output  |   |
| 18 | CML-O     | RD+        | Receiver non-inverted data output  |   |
| 19 |           | GND        | Module Ground  | 1 |
| 20 |           | VCC2       | +1.8V Power Supply   |   |
| 21 | LVTTL-I   | P_Down/RST | Power Down; When high, places the module in the low power stand-by mode and on the falling edge of P_Down initiates a module reset   |   |
|    |           |            | Reset; The falling edge initiates a complete reset of the module including the 2-wire serial interface, equivalent to a power cycle. |   |
| 22 |           | VCC2       | +1.8V Power Supply   |   |
| 23 |           | GND        | Module Ground  | 1 |
| 24 | PECL-I    | RefCLK+    | Reference Clock non-inverted input, AC coupled on the host board – <b>Not required</b>   | 3 |
| 25 | PECL-I    | RefCLK-    | Reference Clock inverted input, AC coupled on the host board – <b>Not required</b>   | 3 |
| 26 |           | GND        | Module Ground  | 1 |
| 27 |           | GND        | Module Ground  | 1 |
| 28 | CML-I     | TD-        | Transmitter inverted data input  |   |
| 29 | CML-I     | TD+        | Transmitter non-inverted data input  |   |
| 30 |           | GND        | Module Ground  | 1 |

**Notes:**

1. Module circuit ground is isolated from module chassis ground within the module.
2. Open collector; should be pulled up with 4.7k – 10k ohms on host board to a voltage between 3.15V and 3.6V.
3. A Reference Clock input is not required.

## Hostboard Connector Pinout



## General Specifications

| Parameter                  | Symbol           | Min  | Typ | Max        | Units | Ref. |
|----------------------------|------------------|------|-----|------------|-------|------|
| Bit Rate                   | BR               | 9.95 |     | 10.5       | Gb/s  | 1    |
| Bit Error Ratio            | BER              |      |     | $10^{-12}$ |       | 2    |
| Max. Supported Link Length | L <sub>MAX</sub> |      | 60  |            | km    | 1    |

### Notes:

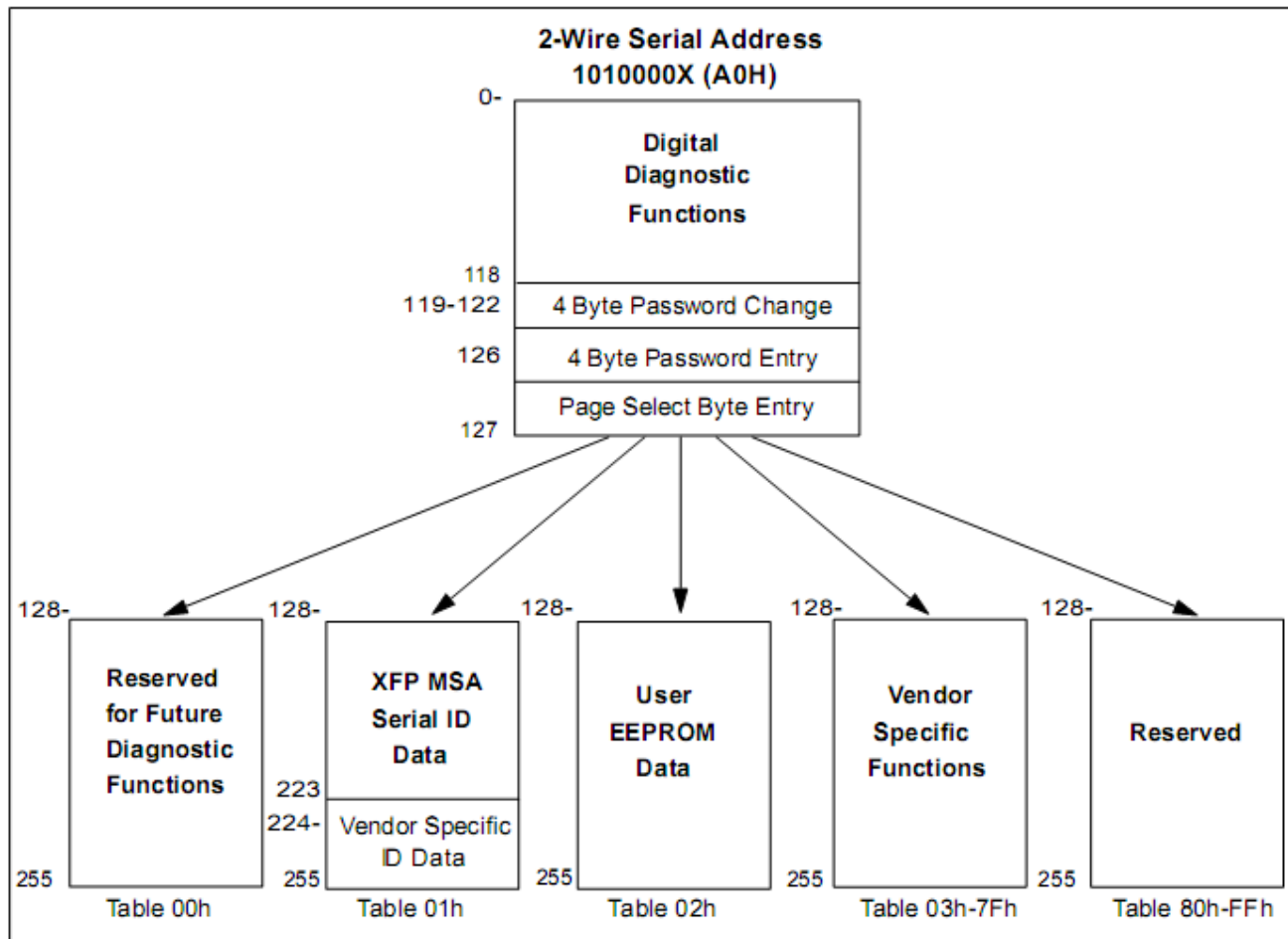
1. Tested with a  $2^{31} - 1$  PRBS

## Management Interface

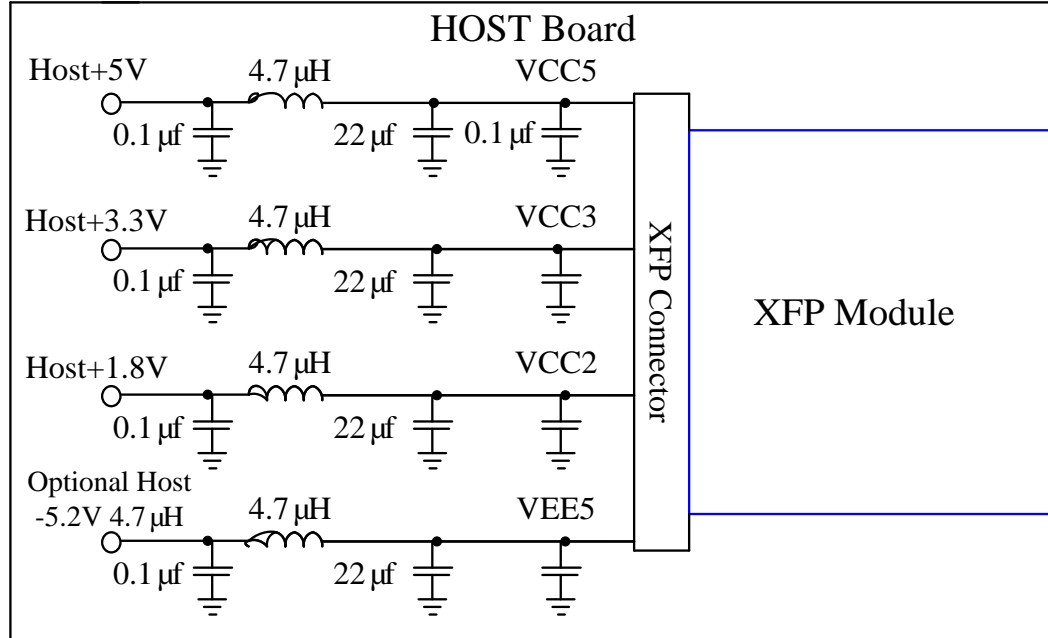
The transceivers provide serial ID memory contents and diagnostic information about the present operating conditions by the 2-wire serial interface (SCL, SDA).

The Module provides diagnostic information about the present operating conditions. The transceiver generates this diagnostic data by digitization of internal analog signals. Alarm/warning threshold data is written during device manufacture. Received power monitoring, transmitted power monitoring, bias current monitoring, supply voltage monitoring and temperature monitoring all are implemented.

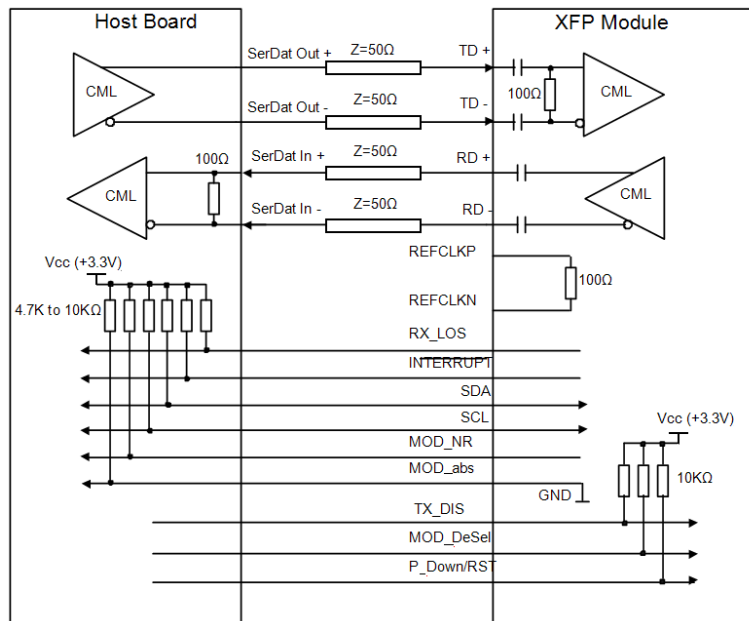
The digital diagnostic memory map specific data field defines as following.



## Recommended Host Board Power Supply Circuit

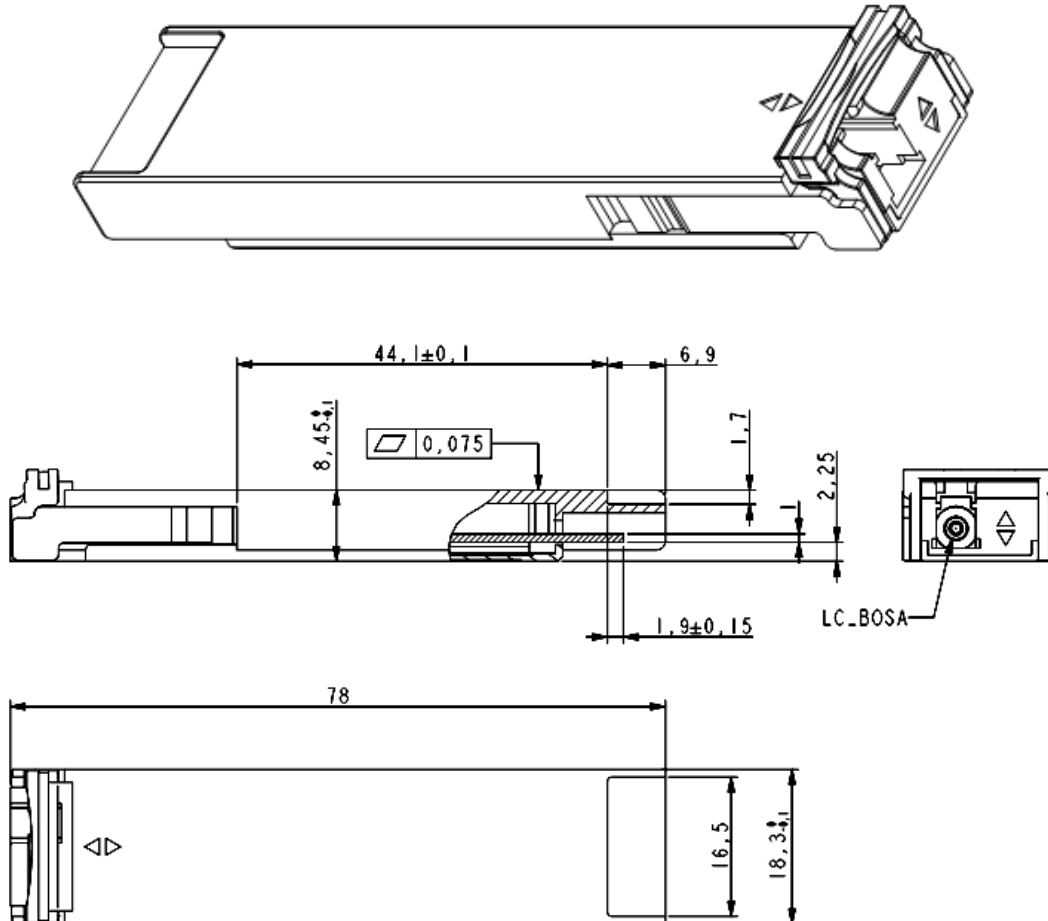


## Recommended High-speed Interface Circuit



## Mechanical Specifications

XFP transceivers are compliant with the dimensions defined by the XFP Multi-Sourcing Agreement (MSA).



## Ordering information

| Part Number     | Product Description   |
|-----------------|---|
| GBX-2733192-E6C | 1270nm DFB laser Transmitter and 1330nm Receiver, 10Gbps, 60km, 0°C ~ +70°C |
| GBX-3327192-E6C | 1330nm DFB laser Transmitter and 1270nm Receiver, 10Gbps, 60km, 0°C ~ +70°C |

## Important Notice

Performance figures, data and any illustrative material provided in this data sheet are typical and must be specifically confirmed in writing by GIGALIGHT before they become applicable to any particular order or





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