

Design Note:

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Using MAX3265 LOS in GBICs

MAXIM High-Frequency/Fiber Communications Group





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1 Overview

The gigabit interface converter (GBIC) is a compact transceiver for high-speed data communications. The receiver portion of an optical GBIC provides a loss of signal (LOS) indication. The MAX3264, the MAX3265, the MAX3268, and the MAX3269 are limiting amplifiers with LOS that are well suited for use in GBIC modules. This application note describes a method that ensures reliable LOS operation under all operating conditions.

2 LOS Operation

Figure 1 shows a host board and a GBIC module, with connections for TX_DATA, TX_FAULT, TX_DISABLE, RX_DATA, and RX_LOS. Figure 2 shows more detail regarding the receiver. If the optical signal is removed from the receiver, LOS is asserted high and the SERDES enters a loop-back mode. In some systems, the LOS indication is used to operate a squelch function, which prevents unwanted oscillations from occurring on the host board. To ensure error-free system operation, the LOS indication should be accurate under all operating conditions, including the unlikely situation where all GBIC pins are connected *except* VCC.

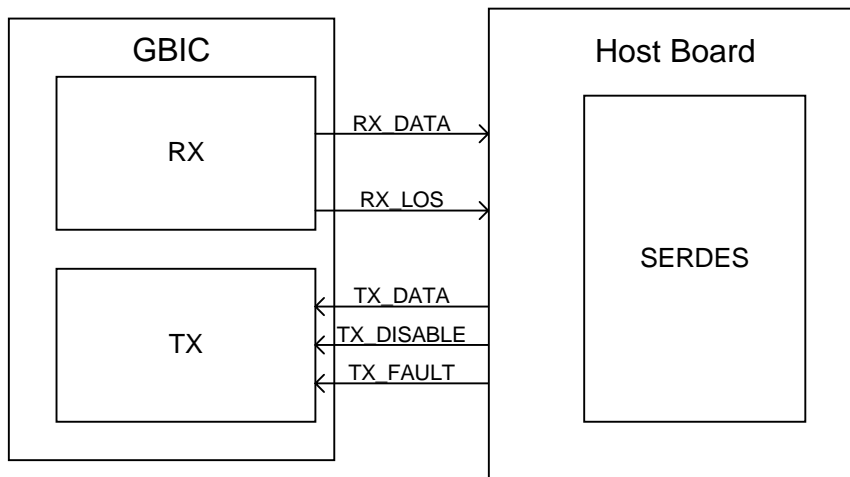


Figure 1. GBIC and host board

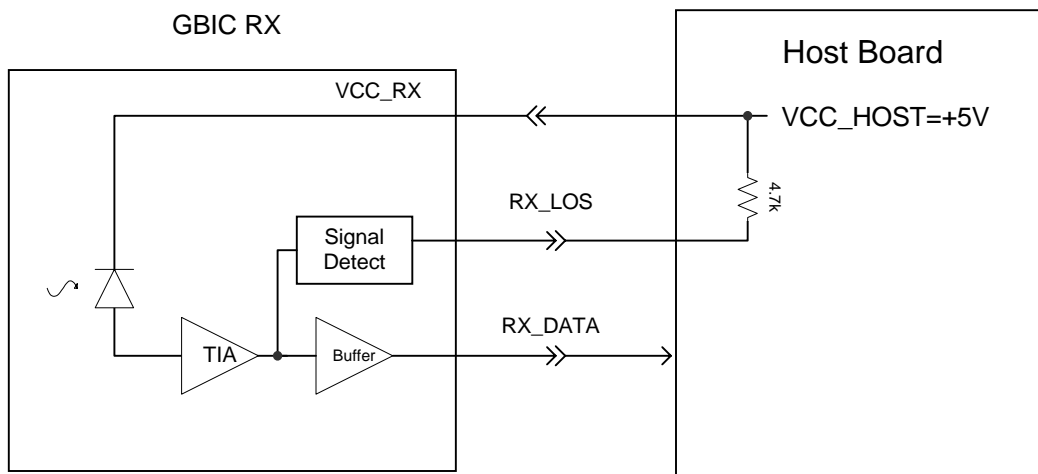


Figure 2. GBIC receiver detail

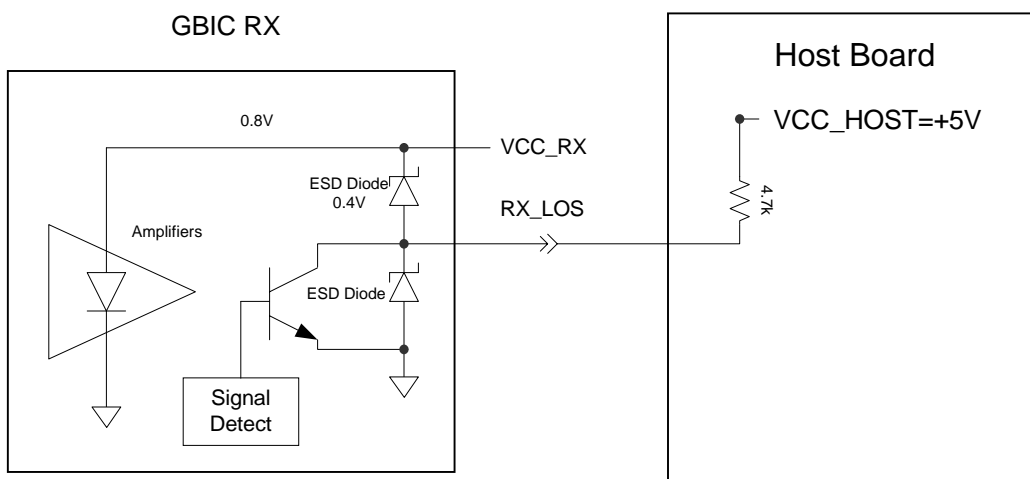


Figure 3. Circuit formed when VCC_RX is not connected

Figure 3 shows the circuit formed by a host board, and GBIC containing a MAX3265 limiting amplifier when VCC is not connected. Although VCC_RX is not connected to the host board, the gain amplifiers inside the IC turn on at approximately one diode voltage (0.8V). Current will flow from VCC_HOST, through the pull-up resistor, the ESD diode, and the

amplifier, to ground. The LOS_RX output will be biased at approximately 1.2V, an undefined TTL state. Because the amplifiers are not operational, the output data contains errors, and LOS should be asserted high (>2.4V). In this example, the LOS output is not accurate.

Figure 4 shows a circuit that corrects this problem. The external NPN transistor inserted between the /LOS\ pin and the host pull-up provides a high-impedance RX_LOS output when VCC_RX is not connected.

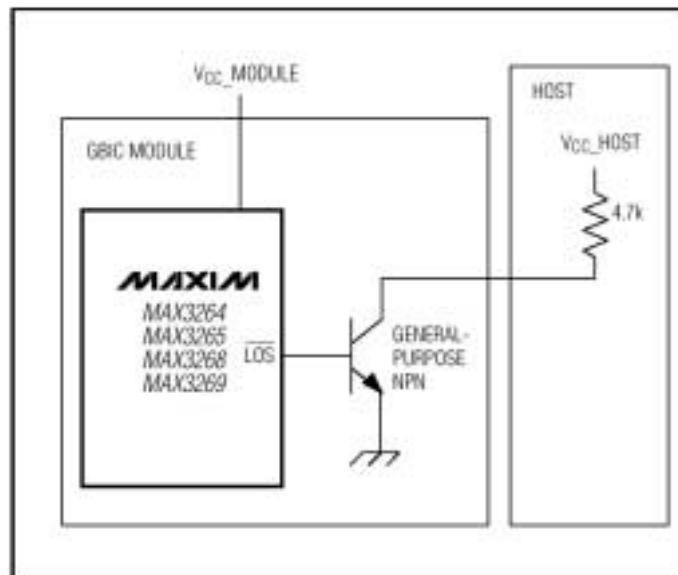


Figure 4. LOS in GBIC application