



## Device Overview

The IDT 89HP0502U is a 5Gbps Repeater IC that reconditions high-speed serial data streams. The 89HP0502U contains two half-duplex data lanes, where each half-duplex lane consists of a differential equalizer, as well as a transmit driver that includes de-emphasis.

High speed serial interconnects are being used as the interconnect medium between various platforms and ICs in all types of computing environments: computing, storage, consumer electronics, and communication applications. The 89HP0502U is targeted to meet the high-performance needs of USB 3.0 applications.

## Features

- ◆ **2 Channel Signal Repeater**
- ◆ **Advanced Signal Conditioning Features**
  - Programmable input equalization
  - Programmable output de-emphasis
- ◆ **Advanced Diagnostic Features**
  - Individual channel loopback
- ◆ **Advanced Power Saving Features**
  - Adjustable output voltage swing
  - Individual channel power down mode support
  - Low power consumption (~110mW/channel)
- ◆ **Built-in Mux/Demux for Fail-Over Support**
- ◆ **I<sup>2</sup>C Programming Interface**
- ◆ **Commercial and Industrial Temperature**

## Benefits

- ◆ **Most cost effective way to boost signal integrity**
- ◆ **Adds margin to your board design**
- ◆ **Simplifies and adds flexibility to board design**
- ◆ **Most power efficient solution**

## Device Description

**Receiver Variable Termination:** Is a ground referenced termination block that supports a 100 ohm termination for normal operation. It also supports a high-impedance (Hi-Z) mode, whereby the receive terminations are placed into a Hi-Z mode.

**Equalizer:** Provides up to 30dB equalization capability in the receiver over 60 inches of FR4 @ 5Gbps while the wide-swing transmit drive offers up to 8.5dB of transmit de-emphasis.

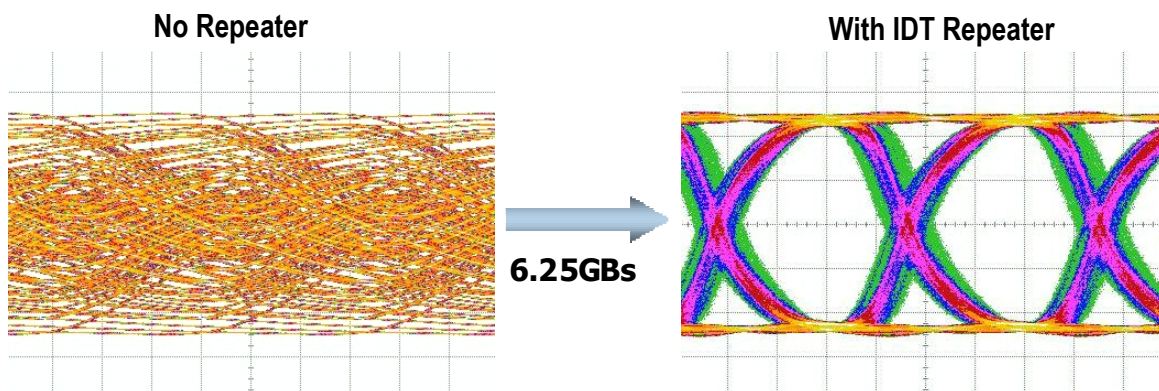
**Signal Detect:** Measures the envelope of the incoming signal and indicates when the envelope has fallen below a programmable threshold. When electrical idle is detected on the receiver, the signal detect output is used to place the transmitter into electrical idle.

**Transmitter Variable Termination:** Is a supply referenced termination block that supports a 100 ohm termination for normal operation. It will also support the following additional terminations:

- **Squelch mode:** The transmitter supports a Squelch mode, whereby the transmitter stops toggling and maintains the transmit common-mode voltage.
- **Standby mode:** The transmit terminations are increased to approximately 1K ohm when the channel is powered down. All current consumption of the driver is disabled and the transmitter common-mode transitions to the supply, VDD.

**Output Driver:** Provides 400 - 800 mVdiff-pkpk output swing. It also provides 0 to 8.5dB of transmit equalization and supports Squelch Mode where the outputs go to common-mode with an exit/entry latency of less than 8ns. Both the amplitude and equalization are programmable.

## Improving Signal Integrity with IDT Repeaters



Example Eye diagram measured on actual silicon with FR4 and PRBS patterns

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