



Device Overview

The IDT 89HP0504U is a 5Gbps Repeater IC that reconditions high-speed serial data streams. The 89HP0504U contains four 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 89HP0504U is targeted to meet the high-performance needs of USB 3.0 applications.

Features

- ◆ **4 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**
- ◆ **I²C Programming Interface**
- ◆ **9x9mm 100-ball FPBGA package**
- ◆ **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.

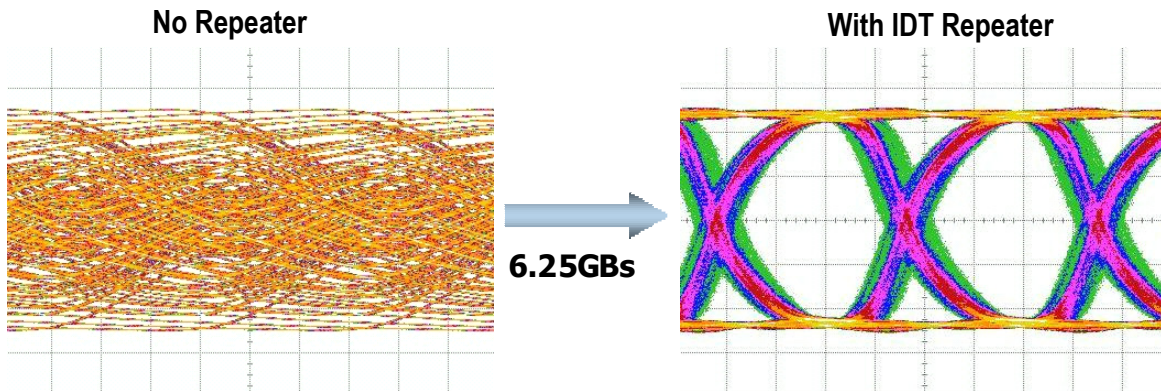
Signal Detect: Measures the envelope of the incoming signal and indicates when the envelope has fallen below a programmable threshold. When electrical idle is detected on the receiver, the signal detect output is used to place the transmitter into electrical idle.

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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