4 Channel 5Gbps USB 3.0 Signal Repeater

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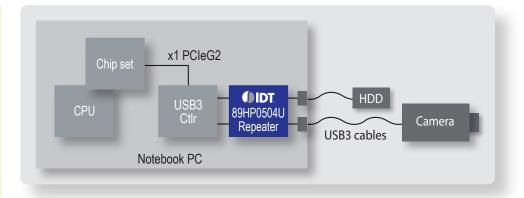

FEATURES

- Compensates for cable and PCB trace attenuation and ISI jitter
- Programmable receiver equalization up to 30db
- Programmable de-emphasis up to -8.5dB
- Recovers data stream even when the differential signal eye is completely closed due to trace attenuation and ISI jitter
- USB 3.0 protocol support
- Configurable via I²C interface
- Supports automatic download of configuration from external EEPROM with a single or multiple repeaters on I²C bus
- Leading edge power minimization in active and shutdown modes
- No external bias resistors or reference clocks required
- Channel mux mode, demux mode, 1 to 2 channels multicast, and Z-switch function mode
- Available in a 36-pin QFN package (4.0 x 7.5mm with 0.5mm pitch)

Benefits

- Extends maximum cable length to over 10 meters and trace length over 65 inches in USB applications
- Speeds up design time by eliminating signal integrity issues
- Minimizes BER, improving system performance and reliability

Applications

- Notebook PCs
- Desktop PCs and workstations
- USB3 cable attached devices
- USB3 host adapter cards
- Active cables and port dongles

Device Overview

The IDT 89HP0504U is a 5Gbps USB 3.0 Repeater device featuring IDT EyeBoost™ technology that compensates for cable and board trace attenuations and ISI jitter, thereby extending connection reach. The device supports USB 3.0 and high speed serial data streams and contains four data channels, each able to process 5Gbps transmission rates. Each channel consists of an input equalizer and amplifier, signal detection with glitch filter, as well as programmable output swing, slew rate, and de-emphasis with delay control. Since all of these features are user programmable, they allow for application specific optimization.

Besides the per channel programmable features, the 89HP0504U provides global programmable settings - termination resistance values and transfer modes.

The 89HP0504U, with its many programmable receiver and transmitter features, is ideal for USB 3.0 applications using any combination of cables and board trace materials.

All modes of active data transfer are designed with minimized power consumption. Also, a wide selection of power reducing modes allows the user to eliminate power of unused blocks. In full shutdown mode, the part consumes less than 40mW in worst case environmental conditions.

USB 3.0 Compliance

The device was designed to provide end users with features needed to comply with USB 3.0 system application requirements:
- – Receiver Detection Support, USB 3.0 LFPS Support
- – Receiver supports high impedance I/O for power reduction
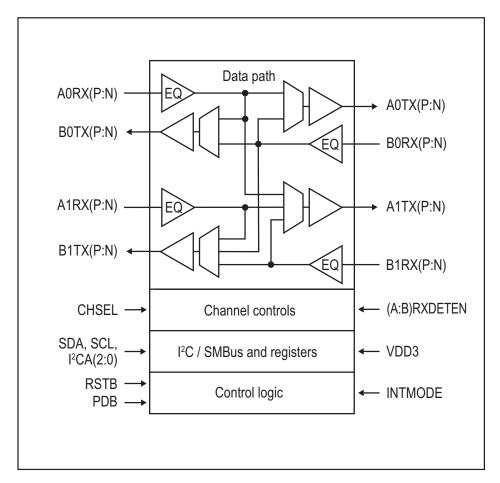- – Jitter, eye opening, and all other key AC and DC specifications

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89HP0504U Block Diagram

The 89HP0504U contains four high speed channels. Each channel can be routed to different outputs. Depending on user configuration via mode selections, input traffic can be muxed, demuxed, or looped back. Powerdown (PDB) and Receiver Detection Reset (RSTB) are provided for easy state and channel control.

Each channel's configuration and performance can be optimized via the I²C interface (SCL, SDA, A0-A2). The programming option allows the user to optimize the repeater's performance in a wide range of applications, making it an ideal solution for most applications requiring cancellation of trace or cable attenuation and ISI jitter.

89HP0504U Block Diagram

Discover what IDT know-how can do for you: **www.IDT.com/go/SIP**

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