

Application: USB2.0 Switching in Notebook PC Docking Platform

Pericom Devices: PI3USB20 & PI3USB40 – USB2.0 Switches

Overview

Pericom's PI3USB20 and PI3USB40 are the first unified USB2.0 Switch solutions in the world. The PI3USBxx USB2.0 Switches are ideal for notebook computers, which offer docking station options integrating the Hi-Speed USB functionality. This single low cost device can replace the hub controller that often resides on the docking station. For notebook manufacturers that have already eliminated the hub controller, and use a higher port count host controller, this is also the perfect solution.



Laptop & Docking Station Configuration

Hub Controller Solution

Notebook computers offering docking stations with USB capabilities can use a hub controller on the docking station. Since these PHY devices are relatively expensive components, the additional usage makes for a more costly design.

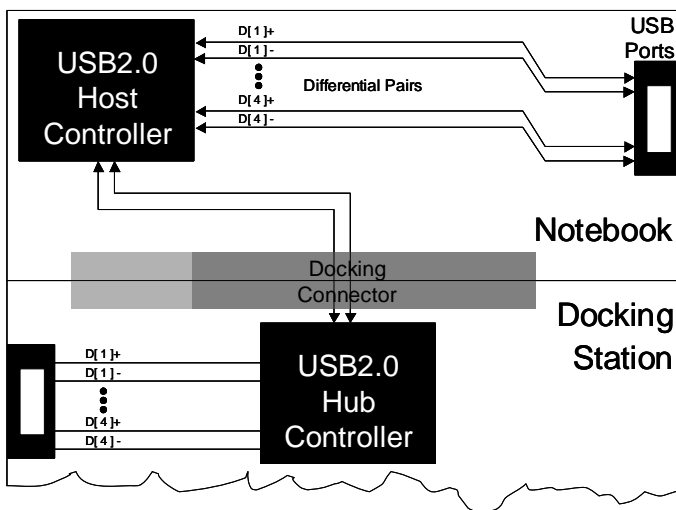


Figure 1: USB2.0 Host and Hub Controller Design

Expanded Host Controller Solution

To save considerable cost, some manufacturers drop the USB hub on the docking station and instead use a host controller in the notebook that has support for the additional ports needed on the docking station. With Hi-Speed USB's growing popularity, it requires the computer manufacturers to do additional routing

on the PCB boards, increases the layout complexity, and introduces more connectors and traces where signal integrity could be degraded.

Solution with the USB2.0 Switch

Pericom's new USB2.0 switches support all the needs of the system with one device. They have also been designed for ease of layout. The PI3USBxx devices align the differential signals from the USB host controller in such a way to reduce Crosstalk and other noise interference between the signal lines.

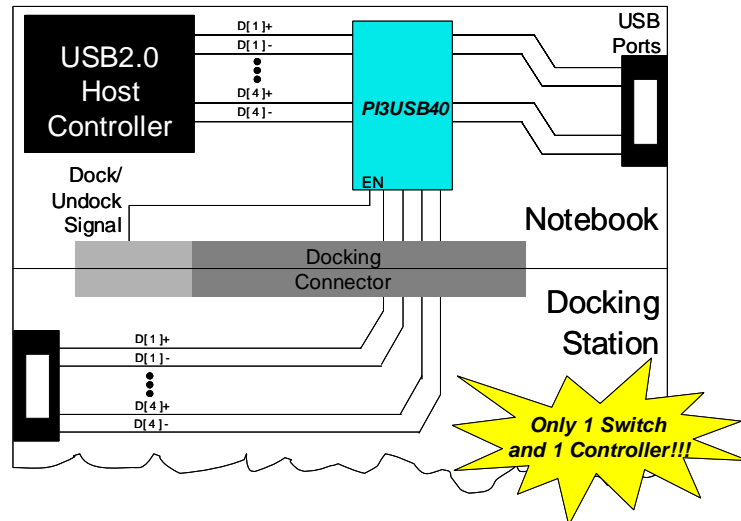


Figure 2: USB2.0 Host Controller with USB2.0 Switch

The PI3USB20 & PI3USB40

The PI3USB20 (4-Channel, 2:1, Mux/Demux) and PI3USB40 (8-Channel, 2:1, Mux/Demux) devices were designed using the same breakthrough technology as the PI3L301D Gigabit Ethernet LAN Switch, allowing them to achieve a bandwidth of 500 Megahertz. This wide bandwidth, in combination with low and flat on-resistance and low on-capacitance, yields a switch that can pass Hi-Speed USB signals with a bit rate of 480 Megabits per second at a signal rate of 240 Megabits per second, without distorting them to the point that they fail the USB Implementer's Forum mandated "Eye" pattern test due to excessive insertion loss.



Key Features & Specifications

- Differential 4 or 8-Channel, 2:1 Mux/Demux Switching
- Low On-Resistance: 4-Ohms
- Low Channel-to-Channel Skew: 100 picoseconds
- Low Crosstalk: -27 decibels @ 250 Megahertz
- High Off Isolation: -32 decibels @ 250 Megahertz
- Near Zero Propagation Delay: 250 picoseconds
- Fast Switching Speed: 9 nanoseconds
- Low On-Capacitance: 6 picoFarads
- VCC Operating Range: +3.0 Volts to +3.6 Volts
- ESD: >2000 Volts ... Human Body Model
- Bandwidth/Data Frequency: >500 Megahertz
- Packages Available: 16 and 48-pin TSSOP

Key Benefits

- Integrated Low, Full, and Hi-Speed Signal Solution
- Lower Cost Solution (Replaces additional hub device or need for higher cost host controllers)
- Easy layout (Does not require multiple PCB layers for routing the I/O lines)

Competition

- None

Product Status

- Samples: Available Today
- Production: Available Today
- Press Release: July 29, 2003

Budgetary Pricing

PI3USB20: \$1.16 per 500 pieces

PI3USB40: \$1.71 per 500 pieces

Additional Information

- Website
 - [Application Note](#)
 - [Datasheet](#)
 - [Customer Power Point Presentation](#)

Contact Information

Please contact your local Pericom Sales Representative or franchised distributor. Contact list provided on the web:

<http://www.pericom.com/partners/index.php>

Or

Application Support:

<http://www.pericom.com/support/apps.php>