Features

- **USB 3.0 Client Interface**
  - USB 3.0 Specification
  - 1 upstream port
  - Supports SuperSpeed, Hi-Speed, Full-Speed modes
  - Four Descriptor-based DMA channels for automatic data transfers
  - Supports USB Duet® Technology
  - USB Auto-Enumeration Technology
  - Support for Bulk, Isochronous, and Interrupt Endpoints
  - USB Power Management
    - USB 3.0 link power management states: U0, U1, U2, U3
    - USB 2.0 link power management states: L0, L1, L2

- **PCI Express Interface**
  - PCI Express Gen 2 (5Gbps)
  - Electrical Compliance to PCI Express Base Specification r2.0
  - PCIe interface and integrated root complex provides two configurations**:**
    - one x1 upstream port
    - one x1 downstream port
  - Reference Clock Buffered Output signals for downstream ports (RC mode)
  - Low latency
  - PCI Express Power Management
    - All link power management states: L0, L0s, L1, L2/L3 Ready, and L3
    - Device states: D0 and D3(hot & cold)
    - Vaux, Wake#, Beacon support
  - 256 byte maximum payload size
  - ExpressCard 2.0 compliance

- **General**
  - Four GPIO pins for maximum design flexibility
  - 10mm x 10mm 88-pin QFN package with 0.4 mm pitch
  - Low power 90nm technology
  - Industrial Temp support
  - Lead-free package

The USB 3380 is a PCI Express Gen 2 to USB 3.0 SuperSpeed Peripheral Controller. It features one PCI Express Gen 2 x1 port and one USB 3.0 SuperSpeed client port.

High Performance and Flexibility

The USB 3380 provides a matching bandwidth at 5 GTps between the PCI Express Gen 2 bus and the USB 3.0 SuperSpeed bus. The controller can easily add a USB 3.0 client port to an existing PCI Express system, as well as convert an existing PCI Express function (endpoint) to a USB 3.0 product. The USB 3380 can configure the PCI Express port as one x1 upstream port or one x1 downstream port. The flexibility allows different system configurations to achieve the maximum performance of the product.

Abundant Software

As the successor of the gold standard NET 2280, PCI to USB 2.0 Peripheral Controller, the USB 3380 can be used with existing NET 2280 software with no or minimal change. Driver stacks are already available in common OS's such as Windows (XP, Vista, 7 and CE), Linux, and VxWorks. The USB Duet software will provide the fastest PC interconnect at 400 mega bytes per second of transfer speed with just a simple USB cable.
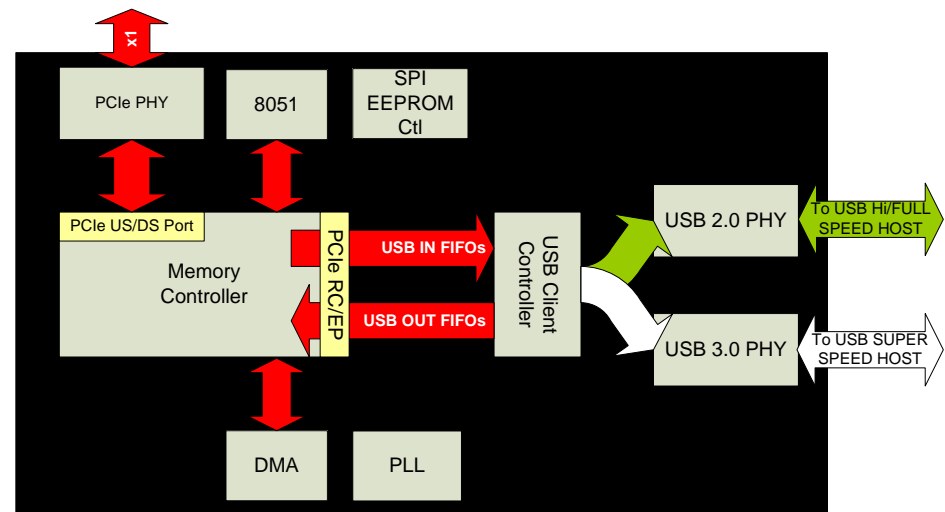

Figure 1: USB 3380 Block Diagram

Applications

Target applications for the USB 3380 as a PCI Express endpoint include PCs, servers, docking stations, printers, and PCI Express embedded systems. The main applications for the USB 3380 as a PCI Express root complex include WLAN dongles, graphics/video dongles, and HDTV tuners/codec.

Add a USB 3.0 Client Port to PCI Express-Based Systems

The USB 3380 can be used to easily add a USB 3.0 client port to any PCI Express based embedded system. As a PCI Express endpoint, the USB 3380's standard PCI Express interface connects directly to any PCI Express bus.

Standard PCI Express registers allow the existing Root Complex to configure and send data to and from the USB 3380.
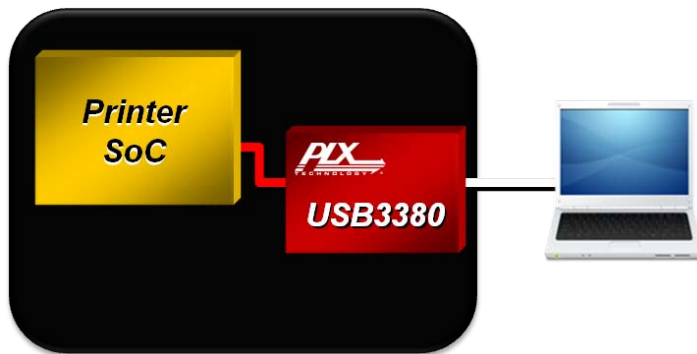

Figure 2: Adding a USB 3.0 client port to a PCI Express-based Printer with USB 3380

Migrate a PCI Express Endpoint to a USB 3.0 Product

The USB 3380 is designed to easily convert an existing PCI Express endpoint/adapter card to a standalone USB 3.0 product.

Instead of a CPU configuring the PCI Express endpoint, the USB 3380 can itself act as the PCI Express Root Complex, with configuration information coming from its internal 8051 CPU or from the USB host. Auto-Enumeration Technology allows a standard USB host to detect this new USB device even if no firmware has been run. This means that firmware can actually be downloaded to the USB device after initial boot-up.
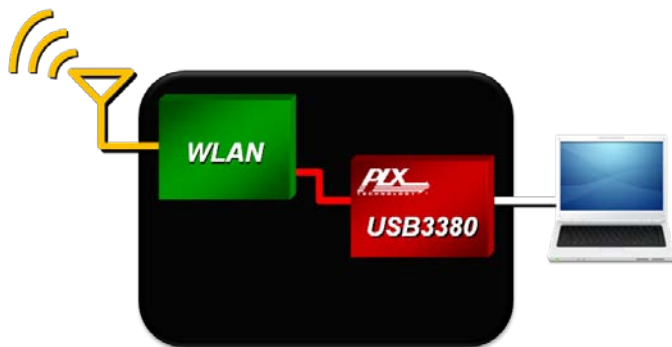

Figure 3: Creating a USB 3.0 WiFi dongle with a PCI Express based Wireless LAN adapter and the USB 3380

The USB 3380 includes PCI Express clock and other standard signals to compensate for those usually found in a typical PCI Express Root Complex environment. The USB 3380 supports one pair of buffered, 100 MHz HCSL output clocks, for its downstream port when configured in Root Complex mode. The clock output pair can be disabled by software or serial EEPROM when not in use, for additional power savings. This feature greatly reduces system BOM cost by eliminating the need for an extra clock buffer on the PCB.

Shared memory in the USB 3380 functions as main memory for holding descriptors or other control data. The integrated 8051 CPU can also be used to configure the device to resemble a standard USB class device (like a communications or video device) even if there is no local intelligence on the peripheral.

Development Tools

PLX offers hardware and software tools to enable rapid customer design activity. These tools consist of a hardware module (USB3380EVK), hardware documentation (available at www.plxtech.com), and a Software Development Kit.

The USB3380EVK is a x1 PCI Express adapter board that easily plugs into any standard PCI Express slot. The USB3380EVK-RC includes an optional PCI Express slot for plugging in another PCI Express endpoint.

Both USB host and peripheral-side software is included with the USB3380EVK. The host-side software consists of USB drivers and test applications. The peripheral-side firmware is used to configure the USB 3380 to resemble a standard USB class device (like a printer or mass storage device) for which no USB host drivers will need to be written. For custom applications, firmware APIs are provided to abstract the USB transactions to reads and writes. While this software is available for various operating systems, it is written in standard C with portability in mind.

Product Ordering Information

Part Number	Description
USB3380-AA50NI G	One x1-port PCI Express Gen 2.0 to USB 3.0 SuperSpeed Peripheral Controller (10x10mm^2)
USB3380-AA EVK	USB 3380 Evaluation Kit
USB3380-AA EVK-RC	USB 3380 Evaluation Kit, Root Complex Mode

Visit www.plxtech.com for more information.