NEC
NEC Electronics Inc.

Overview

The Universal Serial Bus (USB) is a serial interface that provides connectivity for peripheral devices such as the printer, mouse, and keyboards. Two data transfer speeds are supported: full-speed at 12 Mbits/s and low-speed at 1.5 Mbits/s.

The driver side is of differential output, with output enable and slew rate control. The receiver side has a differential signal sensitivity of 200mV and supports a single-end signal level.

The macro features either an on-board pull-up resistor at the upstream side or a pull-down resistor at the downstream side. External pull-up and pull-down resistors are therefore required.

NEC's USB Family Support

| Family	Full Speed	Low Speed	Full/Low Speed
CMOS-8LH (0.5µm Gate Array)	✓	✓	✓
CMOS-8LHD (0.5µm Gate Array)	✓	✓	✓
CB-C8VM (0.5µm Cell-Based)	Jun-97	Jun-97	Jun-97
CB-C9 (0.35µm Cell-Based)	Under Development	Under Development	Under Development

Applications

Today's mainstream Pentium-based multimedia PCs and most of the last generation 486-based PCs have many low-speed "legacy" I/O functions. These functions are either attached to the 16-bit ISA-Bus (Industry Standard Architecture) or have become ISA-functions integrated into an I/O Bridge. This I/O Bridge is connected to a high-bandwidth local bus like the PCI-bus or VESA-VLB. Due to the hardware dependency of these functions, their migration to a virtual OS like Microsoft Windows® 95 or Windows NT® has been difficult.

USB is an industry-standard created to solve legacy and connectivity problems, consolidate the I/O functions, and provide a means for "computer telephony integration". Although USB was initially developed for the x86-based PC platform, the technology is not excluded from the other platforms like PowerPC™, Sparc™, MIPS™, Alpha™, etc. In many ways, USB is helping to shape the multimedia PC of the coming decade.
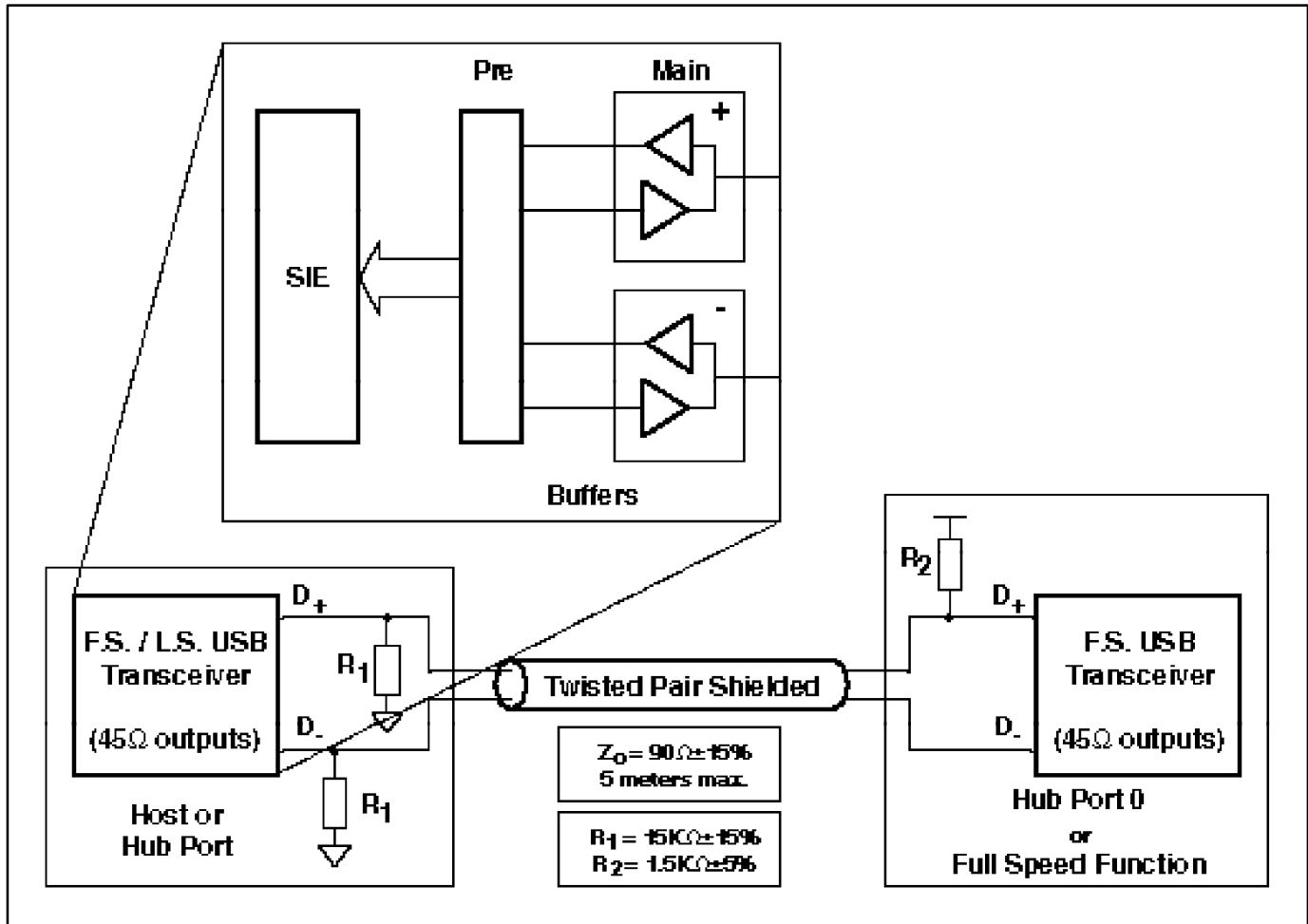
USB Features

- Two data transfer speeds:
    - 12 Mbits/s for full-speed
    - 1.5 Mbits/s for low-speed
- Differential output driver
- 200mV differential receiver sensitivity
- Special +/- full and low speed USB I/Os
- Dual speed I/Os with full and low speed select

Multimedia PC with USB Technology
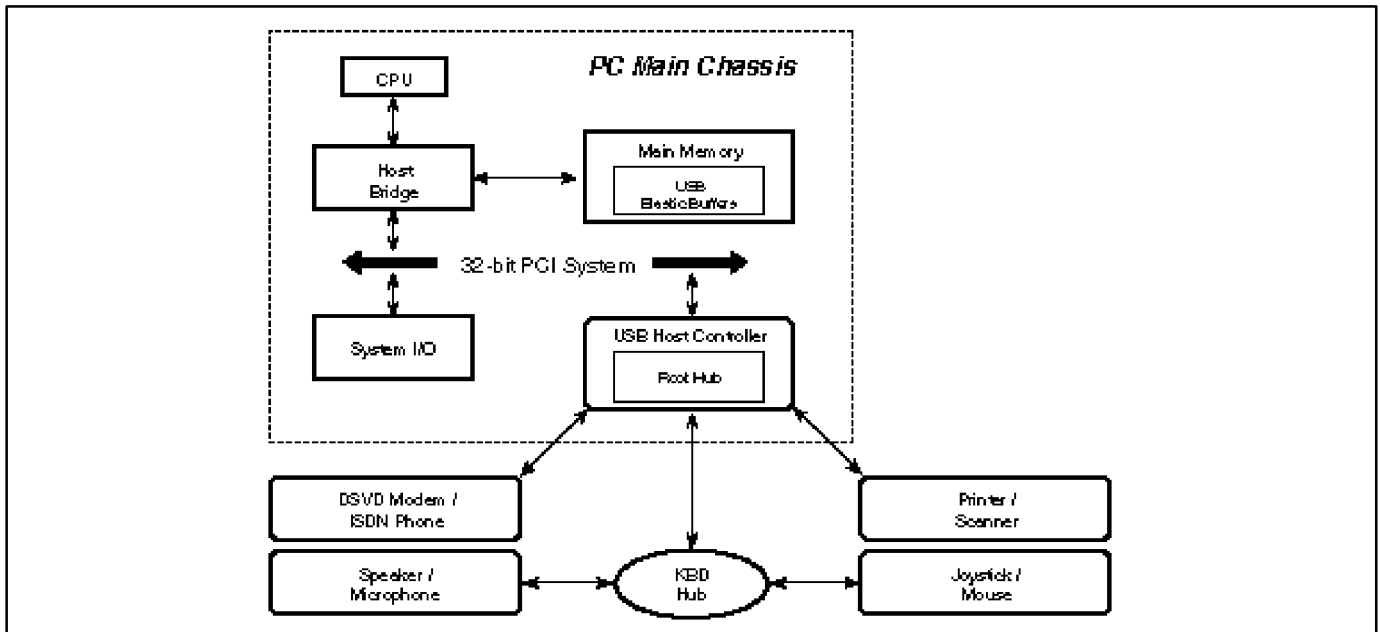
USB Interface

Full-Speed USB Connection Example