

Overview

A leading manufacturer of semiconductor fabrication equipment needed a way to communicate with a large number of serial devices from an industrial computer running their process control software. They preferred using the system's USB port, but required isolation to protect the computer from potentially harmful voltage spikes. Sealevel leveraged our expertise in USB and serial connectivity to design a custom isolated USB to 16 port serial solution.

Application Requirements

- ▶ 16 RS-232 serial ports
- ▶ Isolated USB connection
- ▶ Fast, reliable serial communication on multiple ports simultaneously
- ▶ 24VDC power input
- ▶ Private-labeled appearance
- ▶ 1U, 19" rackmount enclosure

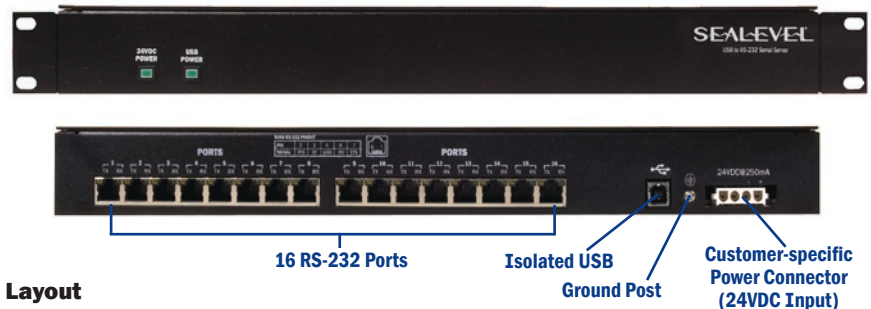
The Sealevel Solution

Using extensive experience in USB to serial solutions and custom chassis design, Sealevel delivered working prototypes meeting all functional requirements in only six weeks. RJ45 connectors were chosen for the RS-232 serial ports with each connector providing separate Tx & Rx indicator LEDs.

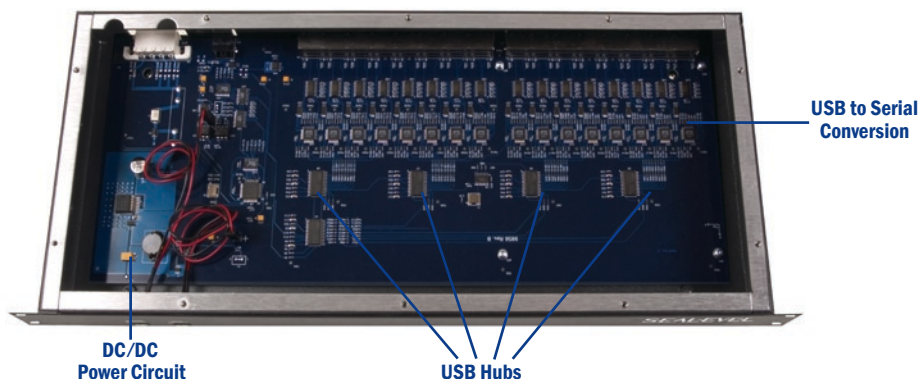
Key Design Challenge: Ensuring Acceptable Throughput

Achieving fast, error-free operation on multiple serial ports simultaneously required careful design considerations. Isolating the USB signal was done using a CPLD (Complex Programmable Logic Device) along with high-speed digital isolators. For the USB to serial conversion, Sealevel used a state machine architecture that reduces host processor overhead compared to traditional processor/UART-based designs and supports baud rates up to 921.6K. As a result, the customer is able to communicate reliably at the required data rates with up to 16 serial devices.

Front and Rear Views of Isolated USB to 16 Serial Port Device



Isolated USB to 16 Port RS-232 PCB Layout



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