

Overview

A world leading developer and manufacturer of critical two-way radio communications systems used by public safety and government organizations such as police and fire departments needed an ultra-reliable industrial computer to monitor remote site operations. Sealevel designed a custom Relio system to monitor all critical site functions and trigger alarms before communication can be jeopardized. Reliability is paramount since the systems may be deployed in remote locations such as mountaintops, deserts, and swamps where a service call would be time-consuming and extremely expensive.

Application Requirements

The customer required a fanless PC compatible design running XPe from CompactFlash. A 1U (1.75") 19" rackmount form-factor was required along with a host of I/O functionality including:

- ▶ Dual 10/100BaseT Ethernet
- ▶ Four RS-232/422/485 ports
- ▶ Four USB ports
- ▶ VGA video
- ▶ 120 optically isolated inputs
- ▶ 96 digital outputs
- ▶ 40 12-bit A/D channels
- ▶ Eight user-programmable color LEDs

The Sealevel Solution

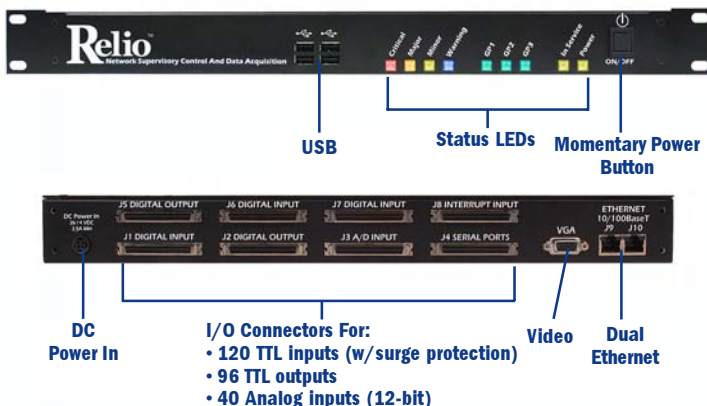
A custom 1U rackmount design provides all required functionality. The system shares the 933MHz single board computer used in the standard 2U Relio with the additional I/O built onto a custom PCB that also includes the DC/DC power supply circuit required for the customer's 9-36VDC input range. The serial, digital, and analog I/O are accessed through 68-pin SCSI-3 connectors mounted in the rear of the chassis.

Key Design Challenge:

Condensing I/O to Fit Size Requirements

On first look, the goal of providing all the I/O required, including the 256 digital and analog points, in a 1U rackmount computer might seem impossible. However, Sealevel electrical and mechanical engineers were able to meet this goal in the short timeframe required. A custom I/O board was designed to provide the digital I/O, analog I/O, and DC/DC power circuit. The custom board is connected to the system's single board computer via a **horizontal PC/104 bridge**. The horizontal bridge allows both boards to be mounted in the same plane and therefore not exceed the 1U (1.75") height requirement. 60" cables connect the system's I/O to external, rackmount termination boards compatible with the customer's wiring requirements. The computer is silkscreened with the customer's name and logo (not shown) to customize the appearance.

Relio Front and Rear Panels



Relio Electronics with Horizontal PC/104 Bridge



Relio Connection to Rackmount Termination Board

