CUSTOMER Spotlight

Relio™ Custom Computing Solutions

Patient Monitoring

Overview

A nationwide provider of healthcare equipment used in hospitals needed a serial I/O intensive computing solution for a redesign of a critical care monitoring system. In their application, a monitoring device provides patient information via RS-485 that must be received and archived to a central server. To avoid the cost of a computer in each room, the system must interface up to 16 patient rooms, timestamp the data, then upload the information to the server.

Application Requirements

Hospital space is at a premium, so a 1U 19" rackmount design was preferred for maximum flexibility in minimum space. For enhanced reliability and cost-effectiveness, a fanless system operating from CompactFlash using the Windows CE operating system was specified.

- 16 Two-Wire RS-485 Ports Using RJ45 Connectors
- 24VDC Provided on Pin 5 of Each RJ45 Connector to Power Peripherals
- 10/100BaseT Ethernet
- VGA Interface
- Externally Accessible CompactFlash Socket
- 100-240VAC Operation

The Sealevel Solution

A custom 1U 19" rackmount enclosure was designed that houses a 400MHz ULV Intel Celeron single board computer and switching AC/DC power supply. To allow the system to meet the 1U height goal, Sealevel designed a custom PC/104 board to provide the 16 RS-485 ports. A custom connector board was designed to mount the 16 RJ45 connectors. The connector board also accepts 24V power from the internal supply and routes it to pin 5 of each RJ45 connector to power the peripherals.

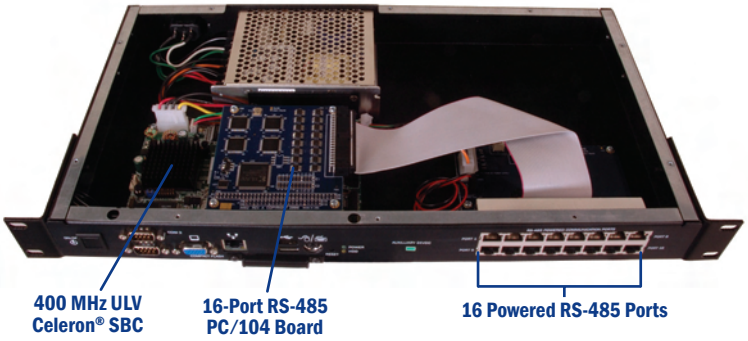
Key Design Challenge:

Implementing 16 RS-485 Ports on a PC/104 Board

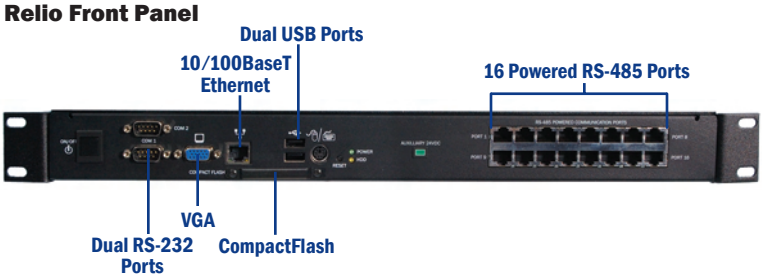
Designing a PC/104 board with 16 RS-485 ports was a challenge from a layout perspective. With careful attention to placement, Sealevel hardware engineers were able to meet the goal of retaining the standard PC/104 form factor (3.55" x 3.775").

Sealevel software engineers also overcame a technical challenge designing the Win CE 5.0 driver required for the serial ports. Win CE expects each COM port to have a dedicated interrupt, but that is not possible using a PC/104 interface. Working with a software partner, Teligy, a custom interrupt sharing algorithm was developed to allow proper simultaneous operation of each serial port for fast, error-free communications.

Relio Electronics with Integrated I/O



Relio Front Panel



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sealevel.com / 864.843.4343 / sales@sealevel.com