

CUSTOMER *Spotlight*

Custom Solutions Aircraft Test Interface

Overview

A leading military contractor performing diagnostic testing and calibration functions on aircraft wanted to reduce the number of physical connections required for their test computer. The contractor was using a combination of Ethernet, serial and digital I/O interfaces between their test computer and aircraft transport rack (ATR). The contractor wanted to limit the costs associated with a custom design by leveraging as much off-the-shelf material and products as possible. The interface solution needed to mount in an existing 19" rack using the 2U (3.5") space available and have as few connections to the test computer as possible.

Sealevel customized a solution that reduced the connections to the test computer to one USB cable and one Ethernet cable. A standard 2U Relio industrial computer chassis houses off-the-shelf SeaI/O data acquisition modules and a common industrial Ethernet switch.

Application Requirements

- ▶ At least four 10/100 BaseT Ethernet ports
- ▶ Four RS-232 serial ports
- ▶ Up to 32 optically-isolated digital inputs
- ▶ Up to 32 Reed relay outputs
- ▶ 128-pin military-style ATR interface
- ▶ 2U, 19" rackmount enclosure
- ▶ 9-30VDC power input

The Sealevel Solution

A Relio R3000 industrial computer chassis met the 2U height requirement and holds up to six SeaI/O OEM modules, which made it the best choice for enclosure. The contractor requested an Ethernet connection to the digital I/O, so Sealevel chose SeaI/O-440E (32 Reed relays) and SeaI/O-430N (32 digital inputs) data acquisition modules. A SeaI/O-681U (8 RS-232 ports) was selected to connect the serial ports to the test computer via USB.

The contractor was using an external test computer, which allowed Sealevel technicians to remove the single board computer from the R3000 and install the SeaI/O OEM modules with their terminal block connectors positioned inside the enclosure. A standard industrial Ethernet switch was also mounted inside the enclosure to provide a single Ethernet connection to the test computer, four Ethernet ports to the ATR and Ethernet connection to the SeaI/O-440E. The SeaI/O-430N is connected via RS-485 to the pass-through connector on the SeaI/O-440E.

A single USB connection from the test computer is passed through the chassis to the SeaI/O-681U USB to RS-232 serial adapter, providing the serial requirements. A custom wiring harness was built to connect the serial and digital I/O and Ethernet ports to the 128-pin military connector.

Key Design Challenge:

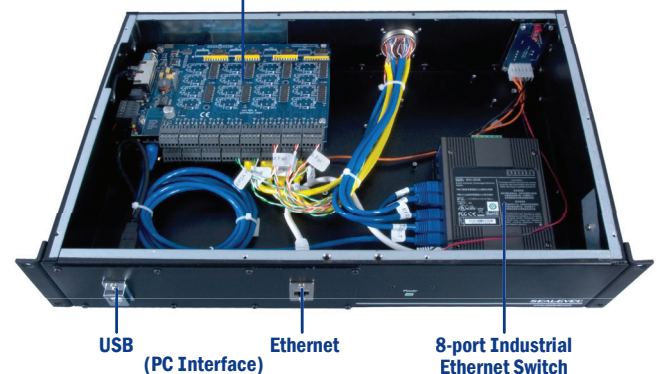
Adding Multiple I/O Points via Ethernet and USB

Because of the customer's unique requirements, a combination of USB and Ethernet SeaI/O OEM modules were selected to provide the serial and digital I/O interfaces. Sealevel technicians created a custom wiring harness that terminates the I/O to the ATR interface. The solution reduces the number of physical connections to the test computer from up to 72 down to **one** USB cable and **one** Ethernet cable. This results in improved reliability due to the reduced points of failure and saves the contractor considerable setup time in the field.

Aircraft Test Interface with I/O Expansion

SeaI/O Modules

- 440E - 32 Reed Relay Outputs (Ethernet)
- 430N - 32 Isolated Inputs (RS-485)
- 681U - 8 RS-232 Ports (USB)



Aircraft Test Interface Rear View



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