

Ratiometric Sensor Board

Features

- Ratiometric Sensor simulation
- 4-wire strain gauge simulation
- 3-wire potentiometer simulation
- Controlled via IEEE-1394 serial interface
- Eight channels per board

Description

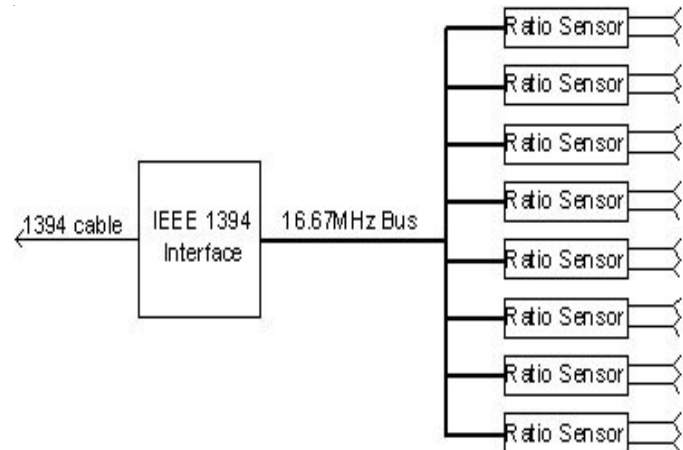
The Ratiometric Sensor board simulates devices whose output is a linear function of an external excitation voltage. This can include 4-wire resistive bridge devices or 3-wire potentiometer devices.

The circuit functions by measuring the external excitation voltage with an ADC and setting 1 or 2 DAC outputs to an appropriate fraction of the input. Common mode voltages can also be generated at the output pins. The Ratiometric Sensor board provides common-mode voltage output for realistic behavior under fault conditions.

The control of this board uses an IEEE-1394 serial link to communicate with model software running in an ADI real-time system (rtX or RTS).

The Ratiometric Sensor board is a standard DIOS board size, 6U by 280 mm. Each of the eight ratiometric sensor circuits is optically isolated from every other ratiometric circuit, as well as from the IEEE 1394 interface. The IEEE 1394 interface receives data and control packets from the ADI real-time system (rtX or RTS) and drives the ratiometric sensor circuits to produce the desired output.

The ratiometric sensor circuit includes 2 DACs each followed by an output buffer with current limiting. The excitation voltage is measured by an ADC. The embedded PowerPC-based microprocessor reads the ADC and sets the DAC(s) outputs as necessary for the functionality of the simulated device.



Distributed I/O System

The IEEE 1394 cable plugs into the Ratiometric Sensor board at the front panel. I/O signals connect to the board at the rear panel connectors provided by the DIOS chassis. Standard connectors are 0.050 series 96-pin D-shell connectors, but other connectors can be accommodated with a custom cable interface board. The IEEE 1394 interface provides two IEEE-1394a compliant ports. This allows for daisy-chaining the 1394 bus to up to 30 additional boards.

Specifications

IEEE-1394 Interface

- IEEE 1394a-2000 Compliant
- 100/200/400 Mbits/s
- OHCI Compliant

Embedded Processor

- PowerPC-based
- On-chip PCI & Local Bus Interfaces
- 4MB On-board Flash Memory
- 8MB On-board SDRAM

Ratiometric circuit

- 8 channels
- Each channel optically isolated and independently powered
- Excitation voltage: 0 to $\pm 10V$ DC
- Input ADC resolution: 16 bits
- Output voltage range, ratiometric: 0 to $\pm 10V$ DC
- Output voltage range, common-mode: 0 to $\pm 9V$ DC
- Output voltage range, differential: 0 to $\pm 0.9174V$ DC
- Output voltage resolution: 16 bits
- Output voltage accuracy (calibrated): $\pm 4LSB$ max
- Temperature drift: $\pm 100 \mu V / ^\circ C$ max
- Outputs ground/short-circuit protected