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24-bit Network Module Bridge



Overview

The NI-9237 includes all the signal conditioning required to power and measure up to four bridge-based sensors simultaneously.

Key Takeaways

A 24-bit network module bridge is a high-resolution analog input module designed to interface bridge-based sensors, providing precise measurements and network connectivity for control and monitoring systems.Overview

24-bit network module bridges, such as the NI 9237, are specialized analog input modules that measure signals from bridge-based sensors like strain gauges, load cells, and torque sensors. These modules feature 24-bit analog-to-digital converters (ADCs), enabling highly accurate and low-noise measurements. They are capable of simultaneous sampling across multiple channels, which is critical for applications requiring synchronized data acquisition .

Key Features
• Channels and Sampling: Typically, modules like the NI 9237 provide 4 differential channels with a sampling rate of 50 kS/s per channel . Each channel has an independent ADC and input amplifier for precise signal capture .

• Bridge Configurations: Supports half-bridge and full-bridge sensors with an integrated excitation current source, allowing direct connection to most torque and load cells .

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• Isolation and Safety: Offers channel-to-earth isolation up to 60 VDC and transient isolation up to 1000 Veff, reducing susceptibility to common-mode voltages and enhancing operational safety .

• Filtering: Built-in filters prevent aliasing and are adjustable according to the data rate, ensuring clean signal acquisition .

• Connectivity: Modules can connect to controllers via RJ50 connectors or networked systems using Ethernet analog I/O modules, supporting protocols like Modbus TCP/IP, Ethernet/IP, and Profinet for peer-to-peer or multicast communication .
Applications

These modules are widely used in industrial automation, automotive testing, structural monitoring, and research laboratories. They are ideal for applications requiring high-precision strain, load, or torque measurements and integration into networked control systems for real-time monitoring and data logging .

Integration and Programming

Modules like the NI 9237 are compatible with CompactRIO controllers and can be programmed using FPGA or scan interfaces. This allows for custom signal processing, calibration, and real-time data acquisition. Networked modules can also be daisy-chained or configured in redundant ring topologies for robust industrial deployments .

Summary

A 24-bit network module bridge combines high-resolution analog measurement, bridge sensor compatibility, and network connectivity, making it suitable for precise, synchronized, and safe data acquisition in complex engineering and industrial systems. These modules are essential for applications where accuracy, isolation, and real-time network integration are critical.

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