Datasheet
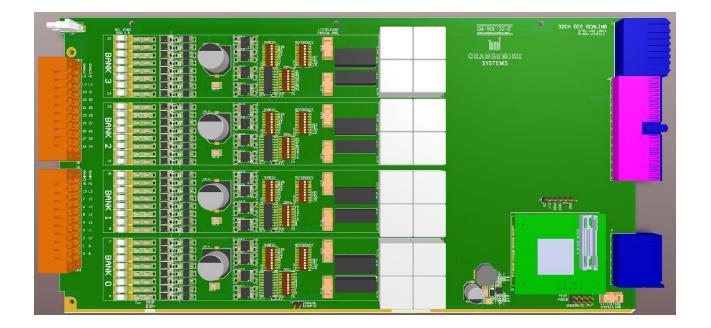## OW-901-32
32 Channel Digital IO Scaling

Overview

The OW-901-32 is a 32-channel bi-directional Digital Signal Conditioning card that scales input and output digital signals from TTL lab-equipment to application (e.g. automotive, aerospace) voltage ranges. The OW-901-32 is designed for the National Instruments (NI) Switch Load Signal Conditioning (SLSC) system, to be used in Hardware-In-the-Loop (HIL) simulators. This card interfaces NI PXI and Compact-RIO instrumentation devices to prototype or production embedded controllers (ECUs or generically Devices Under Test or DUTs) for the purposes of developing, verifying, and validating ECU software and hardware.
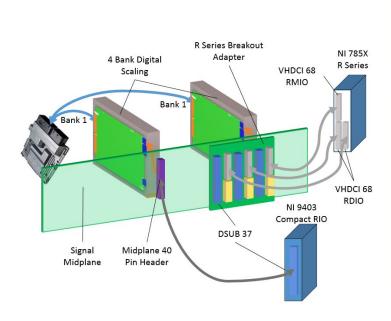
The OW-901-32 installs in the NI SLSC chassis and provides I/O interfacing to the DUT through connectors on the front panel.
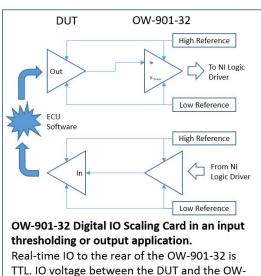
- 32-channel DIO Signal Conditioning
- For NI SLSC system
- 1 SLSC Slot
- 3 to 60V range
- Configurable by channel
- 4 galvanically isolated banks of 8 channels
- 1000mA sink/source per channel
- Configurable input thresholds
- Use with NI PXI or CompactRIO

Each channel can be individually configured as input or output and supports digital signals from DC to 1 MHz on inputs (maximum detectable frequency) and 1MHz on outputs (maximum switching speed) up to a maximum of 60V, with the ability to utilize multiple voltage references, useful for DUT applications involving dual voltage systems such as 12V and 48V, and also handling ECU signals where the voltage reference is supplied by the ECU. The channels are grouped in banks of eight, which can be configured in software (NI Veristand) through SLSC signals from the backplane, or directly on the hardware through switches on the board. Each bank can be connected to different voltage high-and-low references and also joined for common reference voltage.

Input edge-detection thresholds are configurable through software or manual switches. In output mode, each channel can be selectively set as push-pull, and source or sink up to 1500mA. In input mode, users can configure discrete input threshold levels, which are shared across the 8 channels in the bank.

OW-901-32 Digital IO Scaling Card in an input thresholding or output application.
Real-time IO to the rear of the OW-901-32 is TTL. IO voltage between the DUT and the OW-901-32 is defined by the bank references selected from the Midplane or connected to the front panel.

2

Application Information

The OW-901-32 is designed as a general "supply ratiometric" digital I/O front end. It can be used in any situation where the output digital levels or input thresholds change or are "ratiometric" with the power supply.

Typical output uses are to simulate devices that reference vehicle power, such as switches or drive signals like fuel injectors.

Typical input uses are to monitor devices that output a discrete signal referencing vehicle power, such as switches, or drive signals like fuel injectors.

Other applications include:

DC to high speed digital signal outputs simulating
- Push-pull or active low sensors like cam or crank
- Signals involving a pull-up resistor
- Buttons and switches or limit sensors

Verify signal thresholds
- An analog signal stays within a window
- A low signal reaches a certain threshold
- A high signal reaches a certain threshold

DC to high speed digital signal inputs recording
- Ignition signals
- Motor drive signals
- Warning light signals
- Monitoring the state of power signals or loads
- Heater signals
- Signals undergoing fault insertion

Specifications

Absolute Maximum Ratings		
Vref High - Vref Low	60	V
Maximum Voltage from any front panel pin to low reference	60	V
Maximum Voltage on and Rear panel pin to logic common ground	5.5	V
Front panel current from any channel	1500	mA
Maximum current through any reference	6.3	A
Maximum current through front panel reference pins	6.3	A
Rear panel current any channel	5	mA
Output Switching Frequency	1000	kHz

3

Operating Specifications

Input/Output Characteristics	
SLSC Chassis slots required	1
DUT I/O Connector	4 10-pin Weidmuller 3.81mm Omnimate connectors
Number of Channels	32
Default Power-on Line Direction	Input
Reference Voltages	2 high and 2 low user-selectable voltage references per bank of 8 channels
Input	
Voltage Range	Up to 60V
Maximum detectable input Frequency	1000 kHz*
Input edge-detection thresholds	255 (8-bit) user-selectable levels between high and low reference
Input Edge Delay	220 ns Typical (50% threshold)
Input Impedance to Low Reference	44kΩ (±2%)
Minimum Detectable Pulse	960 ns Typical
Output	
Voltage Range Per Channel	3.3-60V
Maximum Current Per Channel	1000mA
Output Rising and Falling Edge Delay	60ns (in push-pull mode)
Output Frequency Range	Minimum: DC
	Maximum: 1000 kHz
Minimum Output Pulse	120 ns
Output Current Protection	1500mA
Output Protection	Two 6.3 A fuses per bank for the High and Low references