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1.1 HIL Device Overview

Processor architecture, connectivity, and interfaces

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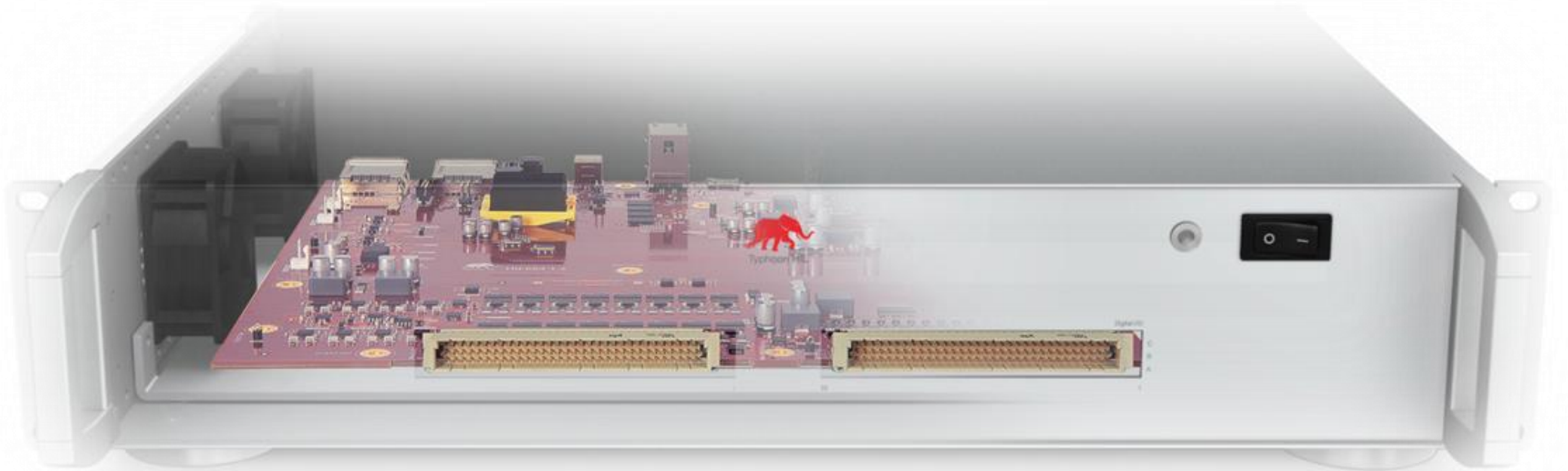

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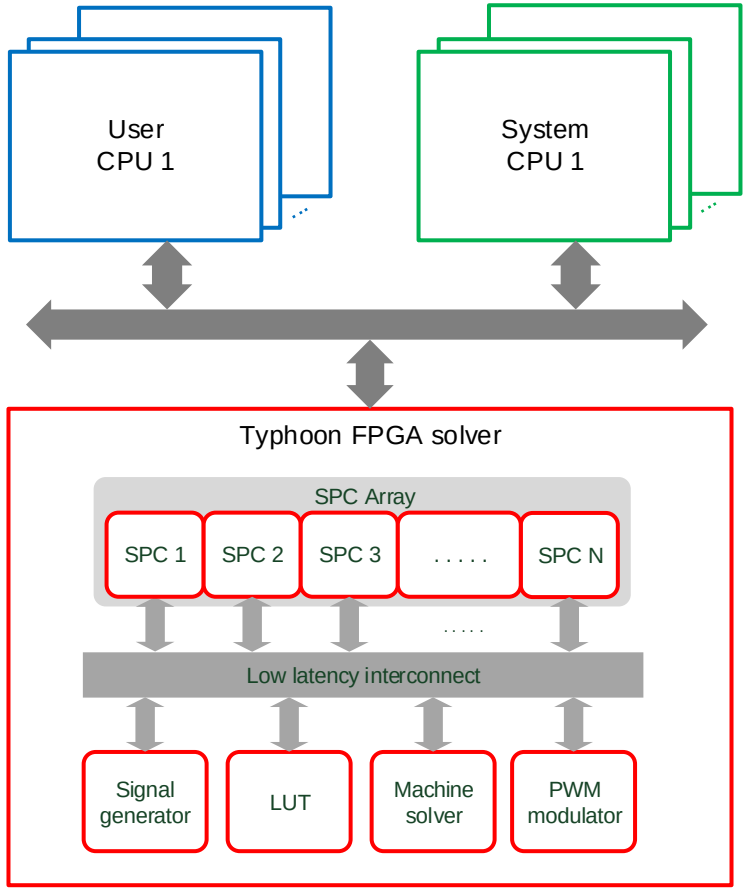
Typhoon HIL device architecture

- **Typhoon FPGA solver**
  - Time-exact simulation of electrical domain models
- **User CPU**
  - Under user control
  - Non-electrical domain parts of power plants
  - Controller algorithms
  - Rapid control prototyping
- **System CPUs**
  - Indirectly controlled by user
  - Low dynamics phenomena and communication protocol stacks



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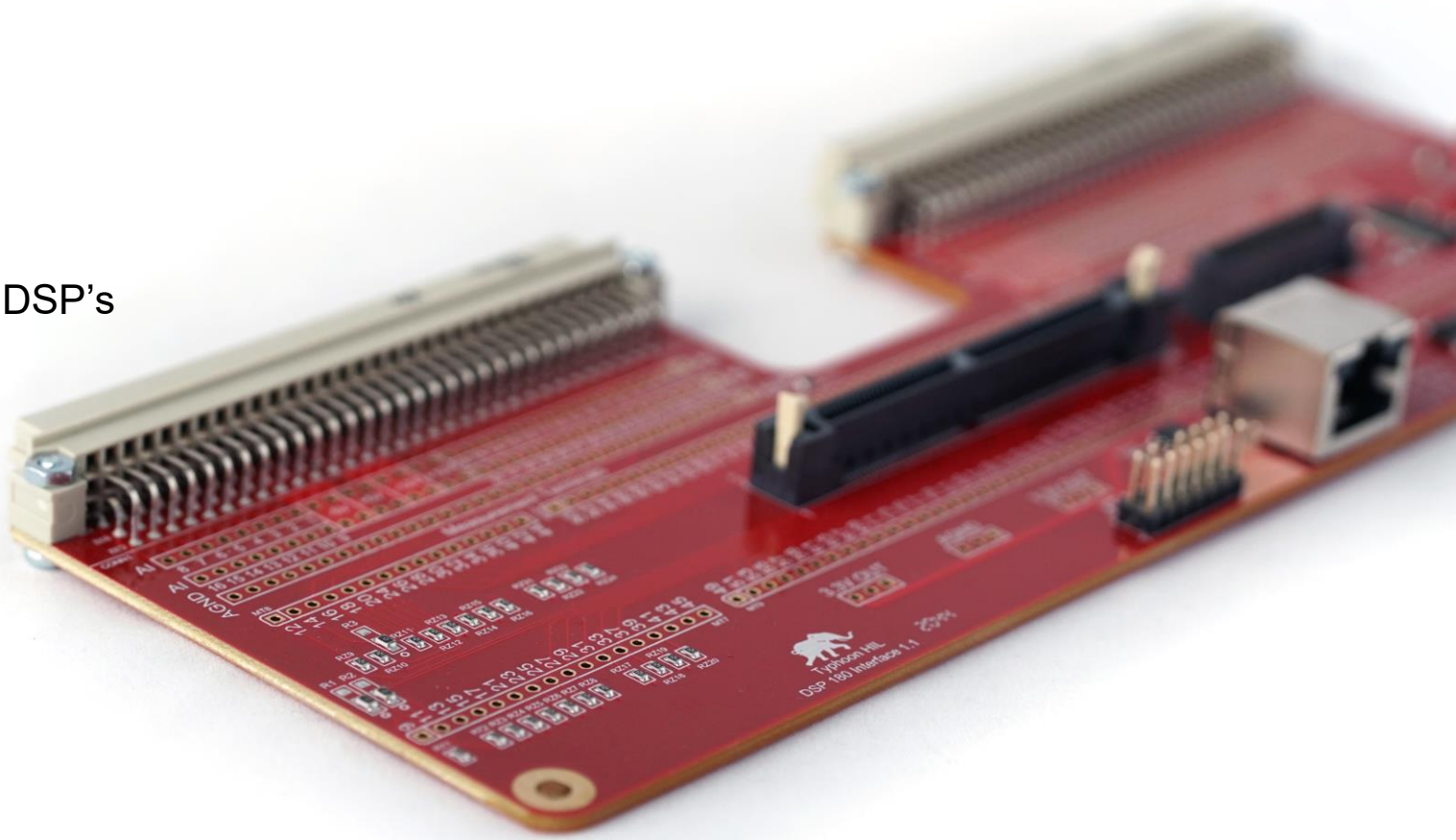
HIL device interfaces

- Typhoon standard interface solutions:
  - DSP 180 interface
  - LaunchPad interfaces
  - HIL Breakout board
  - HIL dS interfaces, and
  - HIL Connect units

DSP 180 interface

- For testing Power Electronics applications with the Texas Instrument C2000 family of DSPs.
- Plug-and-play through analog/digital IO connectors
- Analog signals
  - 24 analog outputs
  - Automatic translation from ±10V to DSP's ADCIN 0-3V
- Digital signals
  - 24 inputs
  - 16 outputs



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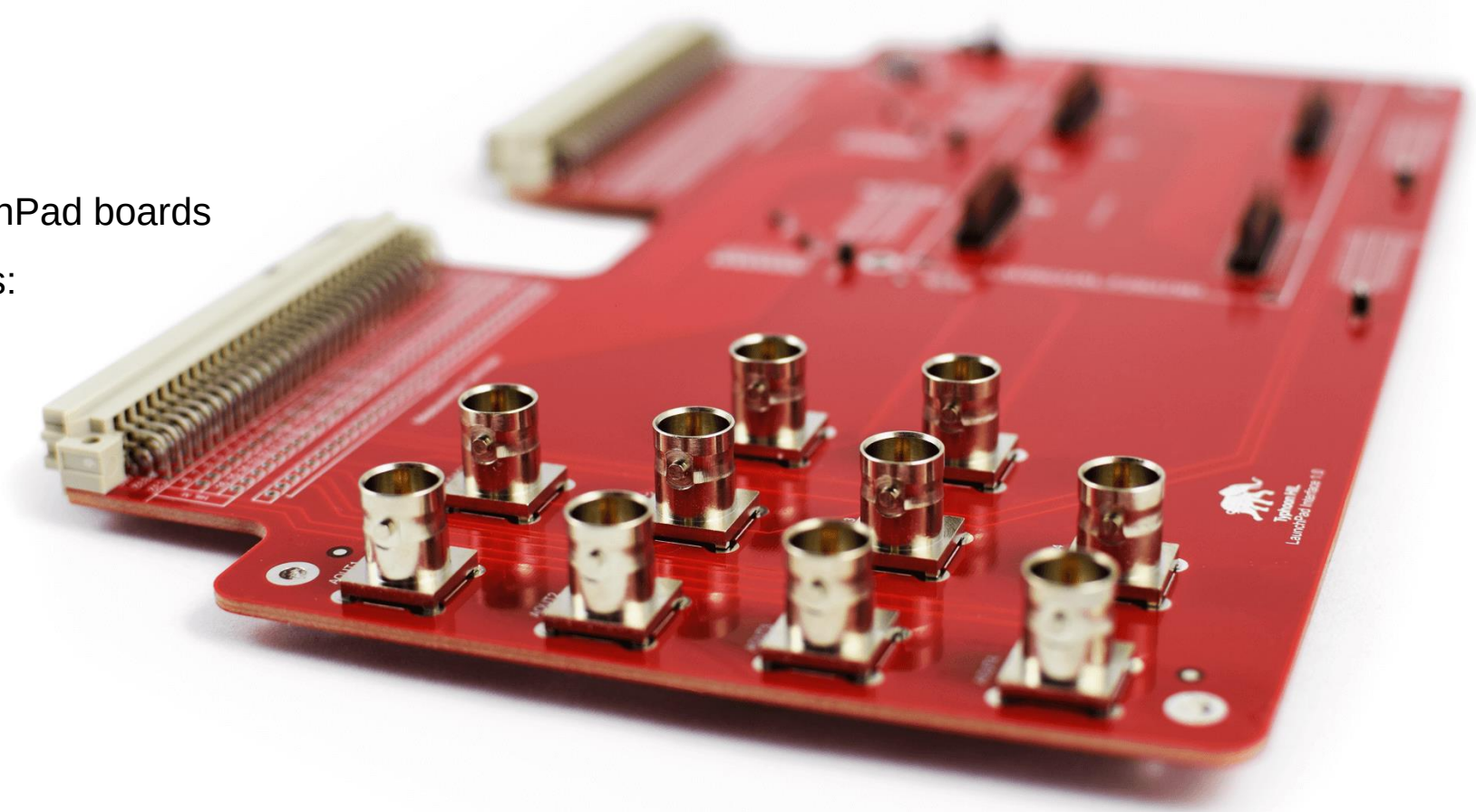
Launchpad interface

- Includes DSP and all other supporting circuitry for communications and power supply
- Analog signals:
  - 16 analog outputs
  - 4 analog inputs
- Supports the following TI LaunchPad boards from C2000 and Hercules series:
  - LAUNCHXL-F28069M
  - LAUNCHXL-F28379D
  - LAUNCHXL-F28027F
  - LAUNCHXL2-TMS57012.



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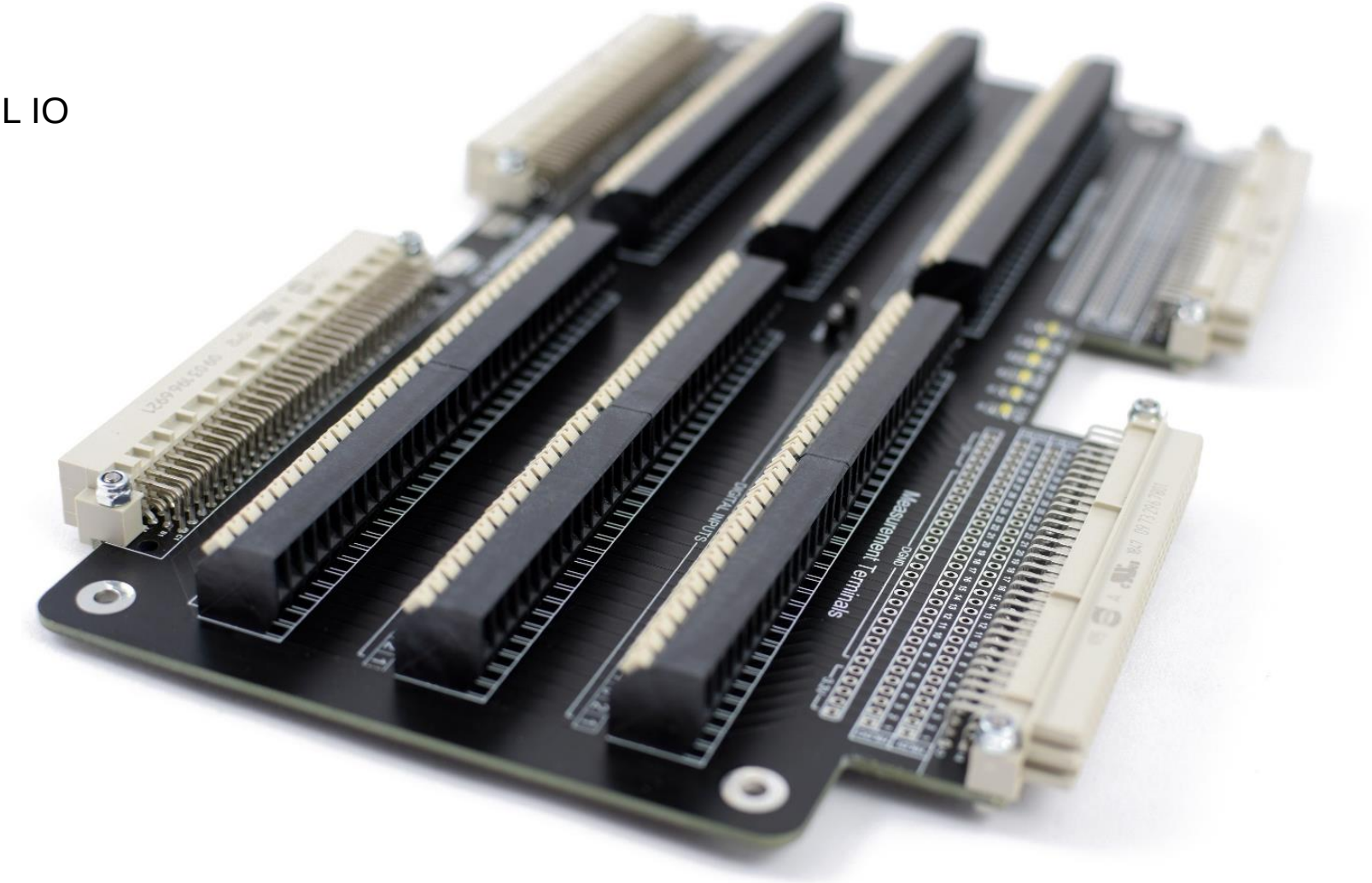
HIL Breakout board

- Passive interface
- Spring cage terminal blocks with HIL IO lines.
- Full interfacing flexibility



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HIL dSPACE interface

- Two types of interfaces:
  - HIL dS Interface Type-A
    - Pin to pin interface
    - dSPACE’s MicroLabBox front panel variant
  - HIL dS Interface Type-B
    - dSPACE’s MicroLabBox top panel variant
    - DS1103 controllers

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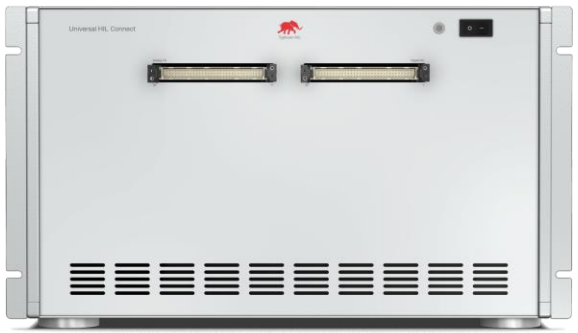
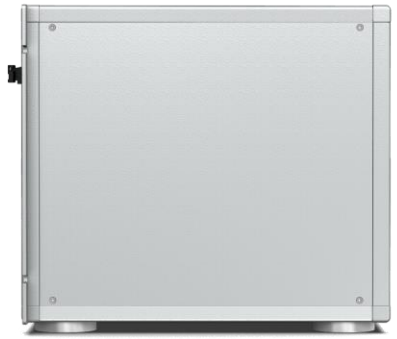
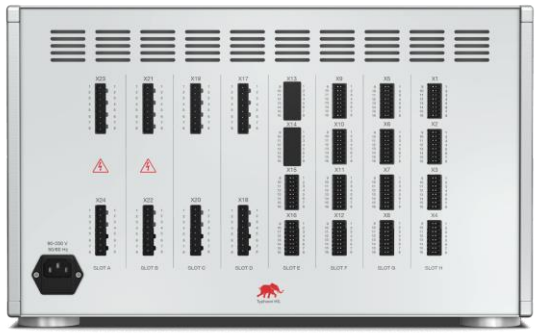
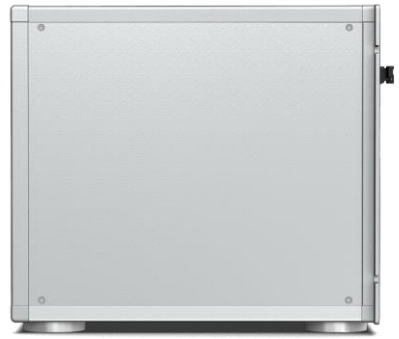
HIL Connect interfaces

- Enables realistic emulation of current/voltage transducers and conditions controller IO signals that are outside of HIL device range.
- Emulate LEM sensors, current transformers, voltage sensors, relays, temperature, and other low-power sensors.
- Input/output impedance matching

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Thank you for your attention!

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