eMEGASIM | OP4510

Closed loop protection relay testing

BDL45-410

OPEN AND FLEXIBLE HIL SOLUTION FOR PROTECTION RELAYS BASED ON MATLAB/ SIMULINK®

Dimensions: 17" (W) x 10.8" (D) x 3.5" (H)

HIGHLIGHTS

- Optimize the real-time performance of Simscape Power System (SPS) with ARTEMiS SSN, a specialized power system solver.

- Unprecedented speed and accuracy with a minimum model time step of 3 microseconds.

- Suitable for network tests with up to 75 states (approx. 90 single-phase nodes on 1 core).

DESCRIPTION

Driven by eMEGASIM, the OP4510 Protection HIL System is designed for R&D testing as well as validation of new protection algorithms. The OP4510 can be upgraded to the latest communication protocols (such as IEC 61850 Goose and SV), and can easily be combined with an amplifier for a wider range of tests.

PURPOSE

This solution lets you run your Simscape Power Systems™ models in closed loop for detailed EMT simulation feedback. Monitor the behavior of the grid, based on the relay under test, with a selection of industry communication protocols.

APPLICATIONS

Protection function testing via analog and digital interfaces or IEC61850 sampled value and GOOSE, protection scheme testing (including virtual relay library), events analysis.

KEY PERFORMANCE SPECS

- Maximum entry-level network size - 75 states (approx. 90 single-phase nodes on 1 core)
- Control loop minimum delay - 7 µs
- Minimum model time step - 3 µs

TYPICAL USE CASE

HIL Process

WORKSTATION — REAL-TIME SIMULATOR — RELAY UNDER TEST

System Configuration	Baseline
HARDWARE	
OP4510 Simulator Intel Xeon CPU - 4 cores - 3.5 GHz, Xilinx FPGA Kintex™-7 325T Connectivity - Ethernet port 10/100/1000 Mbps (2x RJ45). RS232 (DB9), USB2.0, 5-Gbit/s high-speed fiber optic link (4x SFP)	✓
Digital input | 32 channels, 4.5V to 50V, 40 ns high-speed digital I/O	***
Digital output | 32 channels, 5 V to 30 V, 200 ns to 65 ns	***
Analog input | 16 channels, 16 bits, 500 kS/s, +-20V	***
Analog output | 16 channels, 16 bits, 1MS/s, +-16V	***
Timed generation and measurement firmware | Selectable 32 timed digital inputs and 32 timed digital outputs	***
Dual-port Gigabit Ethernet interface board	
Time synchronization board, GPS, IEEE 1588, 1PPS, IRIG-B	***
SOFTWARE	
RT-LAB | Real-time simulation software	✓
eMEGASIM FX75 | Real-time simulation of up to 75 states (sum of capacitors and inductors)	✓
ScopeView | Waveform visualization and analysis software	***
Communication Protocols	
IEC 61850-8-1 GOOSE/Sampled Values/SV data integrity manipulation C37.118 slave/master DNP3 slave/master Modbus slave/master	***

*** Optional