Signal-Level Inverter Test

Testing hybrid and electric vehicle inverters for software and electrical functionality at the signal level with a closed loop simulator. Using a simulator instead of dynamometer lets you test sooner in the design process, test cheaper, and achieve greater test coverage because of the physical limitations of dynos. Systems need to be iterated on quickly to manage rapidly evolving DUTs and meet time to market requirements.

The NI Advantage

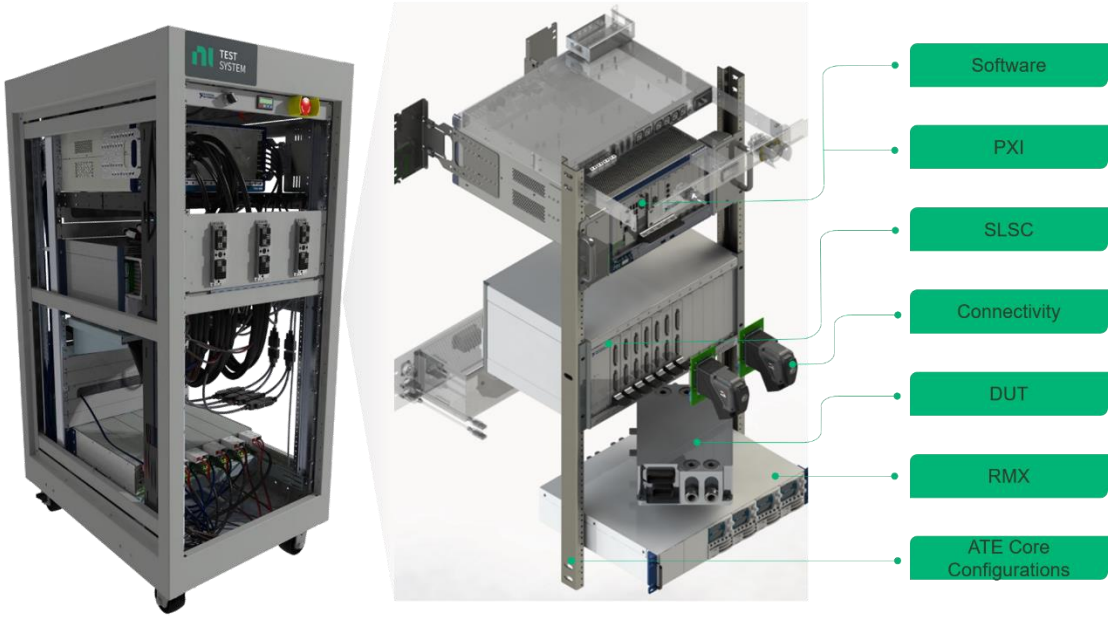
- NI's open and flexible platform-based approach means you can own the test system IP and make changes quickly rather than being solely reliant on a third-party vendor.
- Run motor and electrical models at 1 MHz or faster loop rates to achieve sufficient model accuracy for testing the inverter in simulation.
- Deploy quickly using existing models, tools, and workflows. Test systems need to be up and running quickly with fast delivery schedules.
- Fault insertion in hardware for opens and shorts and software for network messages.

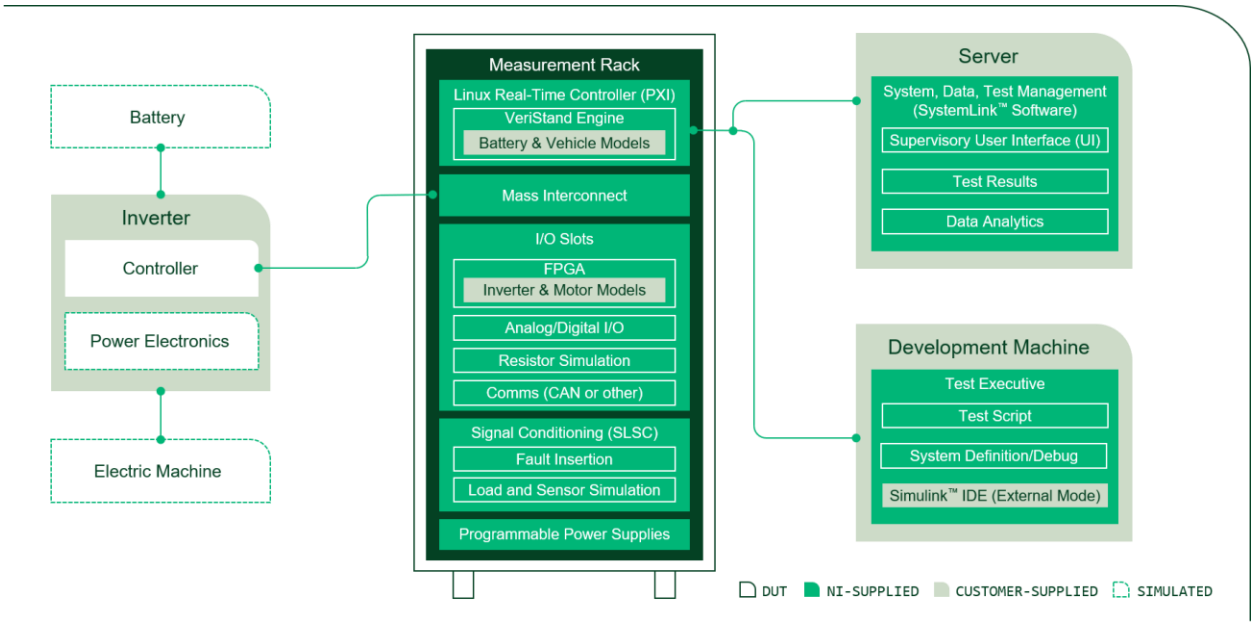
NI Solution:

FPGA Model Simulation.
Integrate 3rd party models, including MathWorks Simulink, on NI COTS FPGA technology.

Multi-DUT Configurations.
Test 1, 2 or 4 DUTs in a single rack with signal conditioning and fault insertion.

Systems and data management.
Facilitate large tester fleet deployments. Make the most of test data.





NI INVERTER TEST SYSTEM ARCHITECTURE

SIGNAL LIST				
Signal Description	Signal Range	4-DUT QTY	2-DUT QTY	Baseline QTY
Motor Phase Current (3-Phase)	+/- 10V with FIU	4	2	1
Motor Phase Voltage (Vab, Vbc)	+/- 10V with FIU	4	2	1
Resolver (1 Differential AI, 2 Differential AO)	+/- 10V with FIU	4	2	1
Inverter Gate Drive PWM Inputs (6 Inputs)	0 to 50V with FIU	4	2	1
CAN or LIN	-	6	5	3
Resistor Channels (10Ohm – 1MOhm)	10 to 1M Ohm	16	16	0
RMX Power Supplies	0 to 30V 0 to 12A	2	1	0
RMX Power Supplies	0 to 60V 0 to 7A	2	1	1

"By adopting FPGA-based simulation using the NI hardware and software platforms, we achieved the simulation speed and model fidelity required for verification of an electric motor ECU. We reduced test time to 1/20 of the estimated time for equivalent testing on a dynamometer."

-Mr. Tomohiro Morita, Subaru

System Integration on Your Terms

NI offers a variety of solution integration options customized to your application-specific requirements. You can use your own internal integration teams for full system control or leverage the expertise of our worldwide network of Alliance Partners to obtain a turnkey system.

To learn how you can increase product quality and shorten test timelines, contact your account manager or NI at (888) 280-7645 or info@ni.com.

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