

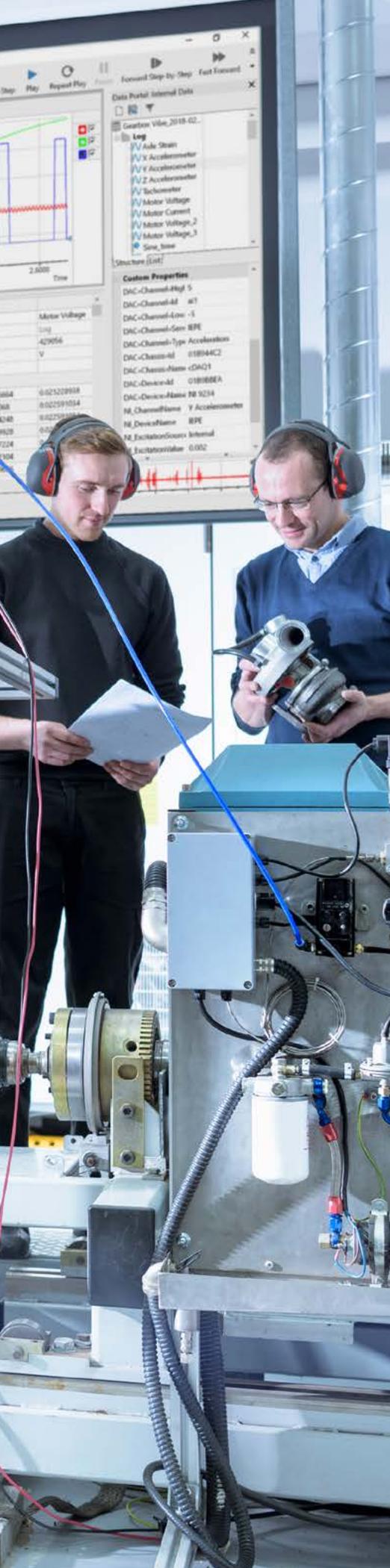
SOLUTION
BRIEF

ni.com



Mechanical Component and Design Durability Test





Explore NI's Solutions

Quality

Have confidence in your test data with hardware designed by a company known for quality with more than 40 years of experience.

Simplicity

Set up your test with turnkey data-logging software that automatically detects hardware and has a real-time UI so you can check your connections.

Flexibility

Use modular hardware and open data formats to get any measurement you need into any analysis software you want to use—now or in the future.

03 GAIN CONFIDENCE FROM QUALITY TEST EQUIPMENT

04 SIMPLIFY SETUP SO YOU CAN FOCUS ON DESIGN VALIDATION

05 CUSTOMIZE YOUR TEST SYSTEM TO YOUR NEEDS

06 GET DATA YOUR WAY AND MINIMIZE CHANGE WITH FLEXLOGGER

07 OUTDOOR-RATED DATA ACQUISITION WITH FIELDDAQ

Gain Confidence from Quality Test Equipment

More complex, but not more delicate, today's electronic devices need to survive the rigor of daily use. Acquiring data from sensors is a foundational step for validating mechanical components, but physical tests present several challenges such as multiple sensor types, costly setup time, and expensive prototype construction. You need quality instrumentation to get data you can trust from these expensive tests.

You can integrate NI's modular data acquisition hardware with turnkey data-logging software to cover a variety of test types including:

- Environmental
- HALT/HASS, operational cycling
- 4-corner thermal
- Drop, load, impact, fatigue
- Noise, vibration, harshness
- Mechanical reliability and durability
- Pressure (seal, gasket, O-ring)
- Power (consumption, peak, harmonics, quality)
- Mechanical components (compressor, motor, and so on)

NI Solution Overview for Mechanical Component Test

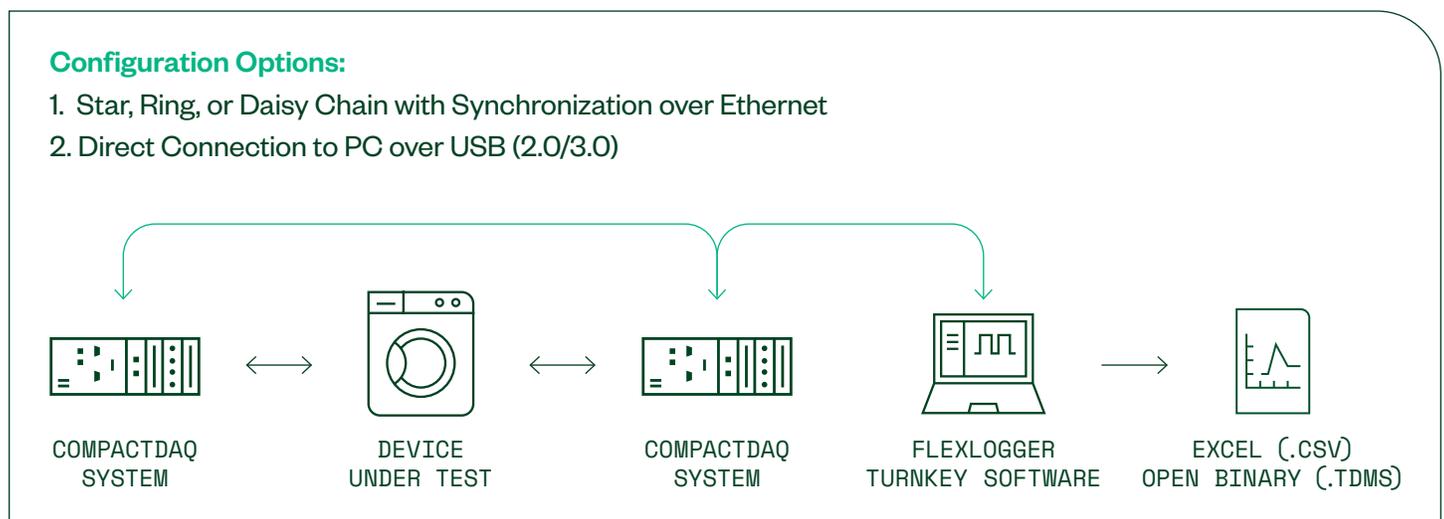


FIGURE 01

Combine CompactDAQ™ systems with FlexLogger™ software to manage multiple mechanical component validation tests.

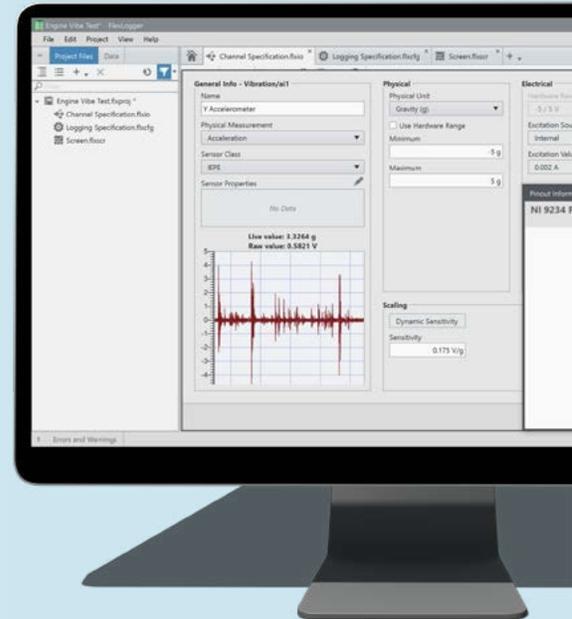
Simplify Setup So You Can Focus on Design Validation

Preparation is key for mechanical tests because they are costly to repeat. NI solutions for mechanical component test help you spend more time on design validation with features that reduce setup effort, including:

- Rugged design for installation close to the device under test to reduce sensor wire lengths
- Synchronization over Ethernet to simplify deploying networked systems
- USB and Ethernet chassis options in a variety of sizes to scale as your project grows
- More than 70 sensor and I/O modules so you can get the measurements you need from one vendor

FlexLogger makes it easier to troubleshoot and verify that the raw data from different sensors is correct before I start my test. This helps shorten test development by saving time typically wasted on redoing configurations.

Andy Tarman
Lab Test Engineer, CNH Industrial



Customize Your Test System to Your Needs

Choose the accuracy, sensor types, connectivity, sample rates, and more that you need to meet test requirements today. Change them as your needs change or as you move to the next project. See Table 1 for measurements.

SIGNAL TYPE	CHANNEL COUNTS	MEASUREMENT TYPES	MAX SAMPLE RATE	OPTIONAL FEATURES
Analog Input				
Voltage	2, 3, 4, 8, 16, 32	±200 mV, ±500 mV, ±1 V, ±5 V, ±10 V, ±60 V	20 MS/s/ch	Ch-ch isolation, anti-aliasing, filtering
Current	3, 4, 8, 16	±20 mA, 0–5 ARMS, 0–50 ARMS	200 kS/s	Ch-ch isolation
Voltage and current	16	±20 mA and ±10 V	500 S/s	Channel-earth isolation, noise rejection
Universal input	2, 4	V, mA, TC, RTD, strain, Ω, IEPE	51.2 kS/s/ch	Ch-ch isolation, bridge completion, anti-aliasing filters, amplification
Thermocouple	4, 8, 16	J, K, T, E, N, B, R, S types	95 S/s/ch	Ch-ch isolation, filtering, CJC
Bridge (strain, force, load, torque, pressure)	4, 8	¼, ½, full bridge (120 or 350 Ω)	50 kS/s/ch	External excitation, anti-aliasing filters
RTD	4, 8	100 Ω, 1000 Ω	400 S/s	50/60 Hz filtering, bank isolation
Sound and vibration	2, 3, 4, 8	±5 V, ±30 V	102.4 kS/s/ch	IEPE, anti-aliasing filters
Analog Output				
Voltage	2, 4, 6, 16	3 V _{RMS} ±10 V, ±40 V (stacked)	1 MS/s/ch	Bank isolation
Current	4, 8	±20 mA	100 kS/s/ch	Ch-earth isolation, built-in open-loop detection
Digital I/O				
Input/output	4, 6, 8, 16, 32	TTL (3.3/5 V) RS422, 5 V, 12 V, 24 V, 48 V, 72 V, 96 V, 120 V AC/DC, 240 V AC/DC	55 ns	Ch-ch isolation, sinking or sourcing input, bidirectional options
Relay	4, 8	60 V DC, 30 V _{RMS} , 250 V _{RMS}	1 switch/s	Ch-ch isolation, SPST or SSR relays
Counter module	8	5 V differential, 24 V single-ended	1 MHz	Ch-earth isolation
Counter function	See digital input/output	See digital input/output	See digital input/output	Digital modules can access 4 counter/timers in CompactDAQ chassis

TABLE 01

Customize your data acquisition system with the 70 sensor modules for CompactDAQ.

Get Data Your Way and Minimize Change with FlexLogger

FlexLogger data-logging application software is designed to get data from a sensor to an open data format without programming. You can export to a .csv file format for ASCII text that is compatible with any software tool (such as Excel) off the shelf. For higher-speed waveform acquisition (common to sound and vibration or power measurements), use a .tdms file format to optimize stream-to-disk performance. TDMS is an open binary file format, so you can import and parse the data using programs written in LabVIEW, MathWorks MATLAB® software, Visual Basic .NET, or Python.

A Solution that Evolves with You

01

Simplify cabling with synchronization over Ethernet

02

Reduce sensor wiring with rugged hardware installed close to your DUT. 50 g shock, 5 g vibration, -40° C to 70° C temp range

03

Scale to your needs with 1-, 4-, 8-, and 14-slot USB or ENET chassis. Connect any sensor with more than 70 I/O modules

FlexLogger and CompactDAQ were designed to help simplify the job of acquiring data. With the configuration-based workflow, validation engineers and technicians can change sensors, sample rates, displays, and more without programming.

Rudy Sengupta
Sr. Director, NI Product Planning





Outdoor-Rated Data Acquisition with FieldDAQ

Have a test that's too big for the lab? FieldDAQ™ incorporates NI measurement quality in a brick-like device rated for use outdoors, even without an enclosure. FieldDAQ is compatible with the same software as CompactDAQ systems, including FlexLogger, so you can mix and match equipment based on test requirements and take advantage of the same workflow as you move from the lab to the field.

FIELDDAQ SPECIFICATIONS

- IP65/IP67 rated to be dust tight and waterproof
- Withstands 100 g shock and 10 g vibration
- Operating temperature from -40 °C to 85 °C
- Standard M12 cable connectors (power, ENET, sensors)

Why NI for Mechanical Component Test?

FEATURE	BENEFIT
Turnkey data-logging software	Enjoy easier test setup and software configuration
Flexible software support options: Python, C/C#, Visual Basic .NET, LabVIEW, MATLAB	Program a more robust test system with software support for the language of your choice
Open file formats: .csv and .tdms	Choose to export to Excel with a .csv format or stream-to-disk with a .tdms format
Quality design from a test and measurement industry leader with over 40 years in business	Have confidence in your test system performance and data repeatability
More than 70 measurement modules	Match sensor to channel count for a cost-effective solution to mixed-signal and higher-channel-count tests
Built-in synchronization over Ethernet	Simplify cabling and installation for large, distributed tests
Rugged hardware design	Spend more time taking care of your test needs and less time working around instrumentation needs



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 NI Partners to obtain a turnkey system.

Contact your account manager or call or email us to learn more about how NI can help you increase product quality and accelerate test timelines at (888) 280-7645 or info@ni.com.

NI Services and Support



Consulting and Integration



Turnkey Solution Delivery and Support



Repair and Calibration



Global Support



Prototyping and Feasibility Analysis



Training and Certification

Author

Brett Burger
Chief Solutions Marketer, NI

ni.com



©2021 NATIONAL INSTRUMENTS, NI, NI.COM, FIELDDAQ, FLEXLOGGER, LABVIEW, AND NI COMPACTDAQ ARE TRADEMARKS OF NATIONAL INSTRUMENTS CORPORATION. OTHER PRODUCT AND COMPANY NAMES LISTED ARE TRADEMARKS OR TRADE NAMES OF THEIR RESPECTIVE COMPANIES.

AN NI PARTNER IS A BUSINESS ENTITY INDEPENDENT FROM NI AND HAS NO AGENCY, PARTNERSHIP, OR JOINT-VENTURE RELATIONSHIP WITH NI. 37296

MATLAB® IS A REGISTERED TRADEMARK OF THE MATHWORKS, INC.