

CAN FD/CAN Bus Conformance Test System

Product Overview

The CAN FD/CAN Bus Conformance Test System by TOSUN, represented in Israel by TrigoPi, addresses a critical challenge in modern automotive electronics: ensuring reliable communication across increasingly complex vehicle networks. As the number of CAN FD, CAN, LIN, FlexRay, and Ethernet nodes in vehicles grows, the network's complexity escalates, making consistent and fault-free communication essential for vehicle safety and functionality.

This product is a rack cabinet test system designed to perform comprehensive conformance tests on CAN and CAN-FD bus implementations. It integrates a controlled power supply, oscilloscope, digital multimeter, and other standard peripheral instruments alongside automotive-specific inputs and outputs such as KL15 (ignition) and KL30 (battery power) connectors.



Figure 1: The TOSUN CAN FD/CAN Bus Conformance Test System rack cabinet.

Test orchestration is managed by TOSUN's TSMaster software, which uses scripted test sequences to achieve broad coverage of vehicle network messages and logic. The system supports conformance testing across the physical, data link, and application layers—including network management, UDS diagnostics, firmware flashing, routing, and bus conformance tests. Test parameters can be configured flexibly via the software's interface, and comprehensive reports are generated automatically, including screenshots of each test case for traceability and documentation.

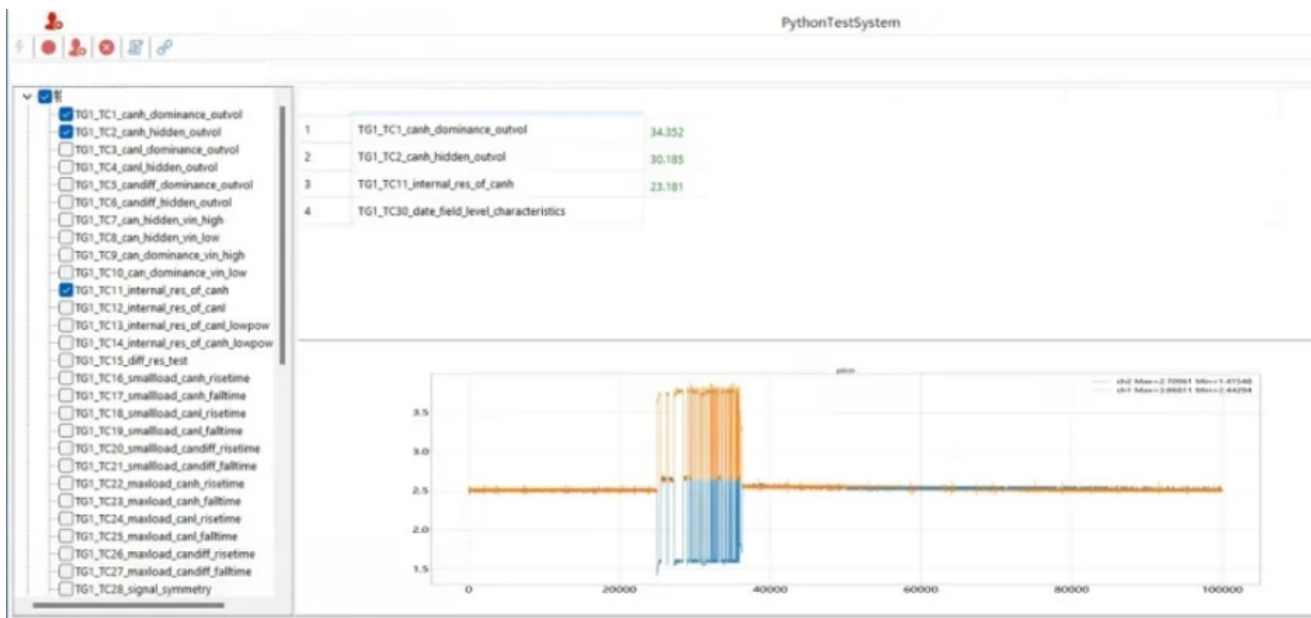


Figure 2: Test parameters configuration interface in TOSUN TSMaster software.

Technical Highlights

The system performs automated conformance tests based on international standards such as ISO 11898 (CAN physical and data link layers) and ISO 16845 (CAN conformance testing). It verifies physical layer electrical characteristics including signal voltage levels, termination resistance, edge timing, and signal symmetry. Data link layer tests validate frame formats, error detection and recovery, arbitration, and bit timing tolerances. Application layer testing covers network management protocols, UDS diagnostic services, firmware flashing sequences, and routing functions.

The integration of precise instrumentation such as oscilloscopes and multimeters enables detailed electrical measurements, while the controlled power supply simulates realistic automotive power conditions. The system's modular design supports extensibility and adaptation to evolving standards and protocols such as CAN XL.

Integration & Applications

Designed for automotive OEMs, Tier 1 suppliers, and component manufacturers, the TOSUN CAN FD/CAN Bus Conformance Test System facilitates early-stage design validation, development verification, and final production testing. OEMs require conformance certification reports as a condition for parts approval, making such test systems essential for supplier qualification.

The system supports testing of network management protocols that coordinate node states in vehicle networks, UDS diagnostics that enable fault detection and maintenance, and firmware flashing processes critical for software updates in ECUs. Its ability to simulate and validate complex vehicle network behaviors helps prevent costly integration issues and supports compliance with automotive safety and quality standards.

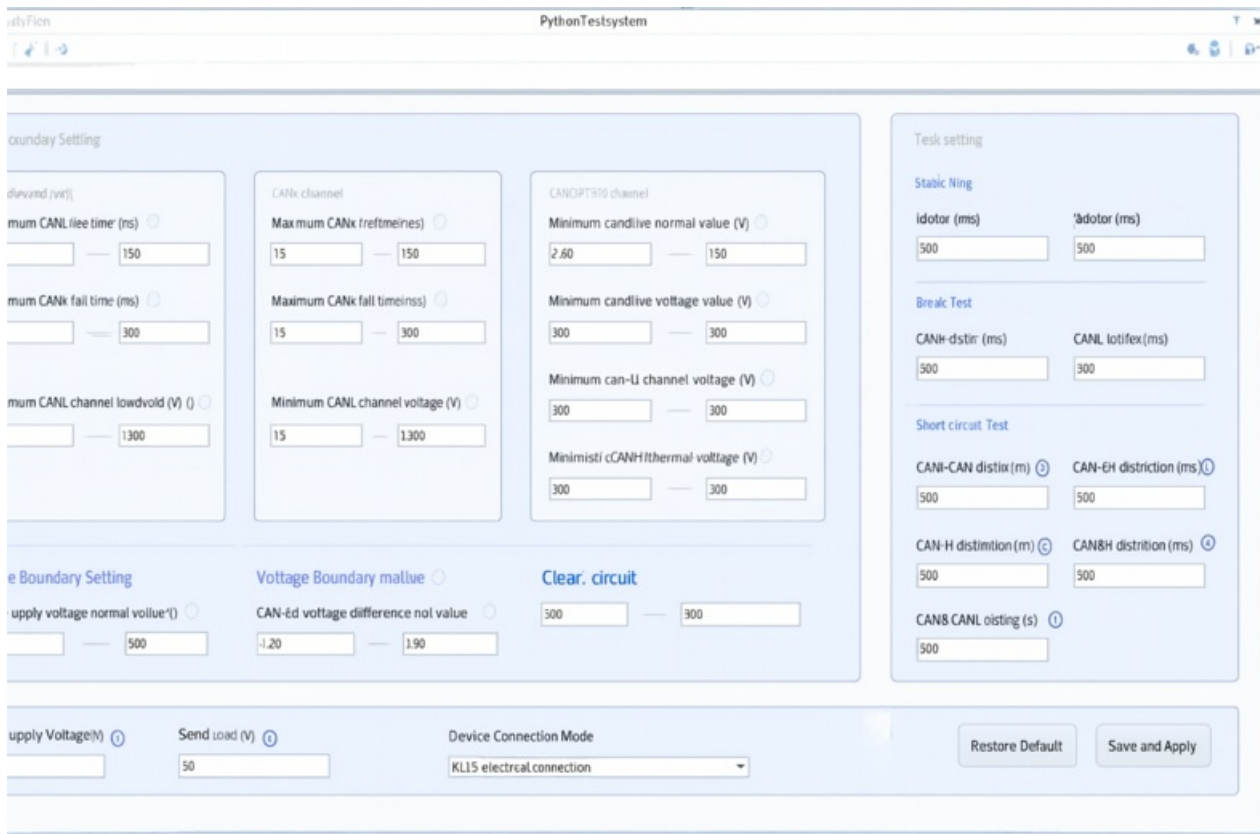


Figure 3: Screenshot of a test case result from the CAN bus conformance test system.

Variants & Support

The test system is configurable to support various CAN network types including Classical CAN, CAN FD, and evolving CAN XL protocols. The TSMaster software provides flexible scripting capabilities, enabling users to customize test sequences and parameters to specific vehicle network architectures and test requirements.

TOSUN and TrigoPi provide technical support and design-in assistance to facilitate system integration and ensure efficient deployment within development and production environments. This includes software updates aligned with new standards, training, and consultation for test planning and execution.

Key Benefits

- Ensures compliance with ISO 11898 and ISO 16845 conformance standards for CAN and CAN FD networks.
- Automates testing of physical, data link, and application layers including network management and UDS diagnostics.
- Integrates precise instrumentation for comprehensive electrical and protocol measurements.
- Generates detailed, customizable test reports with screenshots for certification and traceability.
- Supports early design validation and production testing to reduce integration risks and costs.
- Facilitates OEM qualification requirements and supplier certification processes.

Implementation Tips

- Establish conformance testing early in the design and development cycle to identify and resolve protocol compliance issues before production.
- Ensure proper configuration of test parameters such as bit timing registers and network topology to reflect real vehicle conditions.
- Use the system's scripting capabilities to tailor tests for specific network management protocols and diagnostic services in your vehicle architecture.
- Leverage automated report generation to document compliance and support supplier qualification submissions.
- Maintain regular updates of test scripts and software to keep pace with evolving standards and protocol

versions.

Safety & Reliability Notes

Reliable CAN bus communication is critical for vehicle safety and operational integrity. Conformance testing identifies potential faults that could degrade communication quality or cause network paralysis. The test system's controlled power supply and precise measurement instrumentation ensure that devices are tested under realistic and stress conditions to validate robustness and fault tolerance.

Why Bus Conformance Test Is Needed?

The rapid evolution of automotive technologies has led to an increase in the number of CAN FD/CAN/LIN/FlexRay/Ethernet network nodes within vehicles. As the vehicle network becomes more complex, any communication inconsistencies or faults in a single node can degrade the communication quality of the entire network, potentially leading to network paralysis.

To address these risks, the ISO has issued a series of conformance test specifications such as ISO 16845 for CAN FD/CAN networks, which constrain the development of communication nodes to ensure interoperability and reliability. For OEMs, obtaining bus conformance test certification reports is a necessary condition for parts access. For component manufacturers, embedding conformance testing into the development and design process is essential to meet quality and integration requirements.

We refined this approach at TrigoPi in real projects—reach out if you'd like to see how it applies to your case.

References

- <https://www.tosunai.com/en/tosun-can-bus-conformance-test-system/>
- <https://www.iso.org/standard/69841.html>
- <https://www.can-cia.org/services/canopen-device-conformance-testing/canopen-conformance-test-rules-and-regulations-1>
- https://can-cia.org/fileadmin/cia/documents/proceedings/2013_sappia_bollati.pdf
- <https://www.iso.org/standard/90696.html>
- <https://www.cs-group.de/testing/conformance-tests/can-osi-2/>
- <https://www.protoexpress.com/blog/can-bus-communication-protocol-and-design-standards/>
- <https://www.csselectronics.com/pages/uds-protocol-tutorial-unified-diagnostic-services>
- https://www.autosar.org/fileadmin/standards/R23-11/CP/AUTOSAR_CP_SWS_CANNetworkManagement.pdf
- <https://www.embitel.com/blog/embedded-blog/essentials-of-automotive-network-conformance-testing>

For more information, call us at info@trigopi.com or visit www.trigopi.com.