



Teaming up With Windhill for a Fully Automated Test System

The Challenge

FAW Group Corporation, one of the “Big 4” automotive OEMs in China, was interested in an automated test solution for their new infotainment system. As the center of the consumer driving experience, complex infotainment systems require extensive testing time to flush out issues (especially intermittent problems). Since features are continually changed or expanded in consumer electronics, OEMs require a test solution that is flexible and efficient to minimize time-to-market. Windhill Ltd., a leading supplier of technology solutions in China, designed a fully automated test system for FAW that simulated human and vehicle interactions with the infotainment system.



The Solution

Windhill teamed up with Danlaw to provide a testing solution for FAW. Danlaw’s experience with building custom test equipment, operating infotainment test labs, and automating them with MxSuite test automation software was the perfect match for Windhill’s integration capabilities.

To build the test system, Windhill started with MxSuite’s plug-in support for commercial-off-the-shelf (COTS) test equipment, then used its standard customization interface for additional devices. Next, MxSuite’s intuitive graphical interface made it simple for Windhill’s engineers to develop test cases and execute their test scenarios. Comprehensive test reports are produced that highlight the root symptoms of any failures.

Test System Features

Simulated Human Interaction – With a robot and machine vision system, MxSuite simulates the ‘ears, eyes, and hands’ of the user, and automatically checks infotainment system behaviors against specifications. A robot uses gestures on the touch screen, such as click, slide screen, two-finger zoom, and knob operation, as well as physically manipulating buttons and knobs. For machine vision, an industrial camera and frame-grabber software captures screen images for image processing by MxSuite. Voice commands are synthesized, and audio responses are analyzed to functionally test the vehicle speech recognition and control functions.

Navigation Testing – MxSuite simulates drive routes via GPS satellite radio frequency equipment and uses machine vision and speech-to-text (or text-to-speech) to validate the navigation functions.



Mobile Device Support – MxSuite tests the connection and reliability of customer mobile devices over the Bluetooth network while verifying phone connection, calling, text transmission, and other functions. An audio capture board detects audio frequency content and volume levels.

Radio Operations – MxSuite controls low power FM/AM radio stations simulators and tests user operations for station search, automatic search, information display, and other radio functions.

“Restbus” and Hard-wired Simulation – For restbus simulation (the car network, i.e., CAN, LIN, and Ethernet), MxSuite automatically sends messages and signals, which are imported from the FAW’s standard database files. A multi-function data acquisition board provides analog inputs/outputs, digital inputs/outputs, resistance loads, and power to meet the external test requirements of the infotainment system.

Other Vehicle Functions – The test system uses a precision power supply to test the response of the infotainment system under quickly changing power conditions, such as vehicle startup, accessory operation, and driving conditions. A diagnostic tool automatically scans the ECUs, saves the scanned file, and imports the information into the test report.

Conclusion

In addition to running a full functional test regression, FAW can automatically execute a subset of tests repeatedly for hours on the infotainment system to find the bugs that only occur over long periods of time. Thinking beyond the specified customer requirements, Windhill and Danlaw provided a flexible test system that can be easily updated or modified to address future functionality. New tests can be easily added as new infotainment features are developed.

About Danlaw

Danlaw is a global leader in connected car technology and automotive electronics. We focus our efforts on research and development to create intelligent solutions for an increasingly connected world. Our team is dedicated to revolutionizing mobility by driving innovation and bringing people together. Danlaw’s engineering professionals provide embedded electronics solutions to OEMs and Tier-1 suppliers. Our team specializes in embedded systems development and testing for Embedded Control Units, vehicle network communications, infotainment systems, and telematics.

Contact Us

If you would like to learn more about how you can team up with Danlaw for infotainment test solutions, please contact our team at sales@danlawinc.com.

