
Interacting with Bus protocols on your UUT, use the TestStation PXI Expansion Board

Adding focused functional tests through the use of industry standard bus protocols

Application Overview

The target UUT is an automotive dashboard which supports the CAN Bus protocol. A standard In-circuit test program has been developed to test for structural defects such as shorts, opens, value and basic function for analog and digital devices. The customer wished to integrate several post ICT test processes at ICT in order to extend the test coverage at ICT and to create a more efficient process.

The focus of this application brief is to illustrate that by utilizing the TestStation PXI Expansion Board, Dynamic Programming Extension and third party CAN Bus instrument, the user was able to achieve their desired goals in a clean and efficient manner.

Hardware/Software Requirements

The application requires a TestStation UltraPin test system equipped with an Integrated System Controller, Accessory Slot w/TestStation PXI Expansion board, Dynamic Programming Extension License and TestStation Software version 6.4.0 Patch 20 or higher.

Application Description

The current build process for this UUT involves several post ICT steps that perform functional test, calibration, and flash and EEPROM programming, all implemented through the UUT CAN Bus. While valuable and necessary, these steps add additional dedicated equipment, floor space, operators and handling time, increasing process cost and decreasing throughput. The user wished to re-host these steps on the TestStation in order to reduce costs and increase efficiency.

The fundamental requirement to implement these steps is to be able communicate with the UUT CAN Bus. Due to the complexity of the application, this requires using a dedicated high speed CAN Bus controller, which is integrated into the TestStation using the PXI Expansion board and the Dynamic Programming Extension.

The UUT is installed in a standard ICT Fixture (shown in Figure 1.) The CAN bus instrument being utilized is a Goepel PXI 6181 (Image shown in Figure 3.) which is installed in the TestStation PXI Expansion board (shown in Figure 2).

Figure 4 shows the PXI chassis, the top portion of the PXI Expansion Board and the cabling between them. The top portion of the PXI Expansion Board is a relay matrix that is controlled through standard TestStation test language so that the appropriate signals may be connected to the receiver resources and then to the UUT.

The completed application is a combination of the traditional TestStation ICT test program (TPG), generated using TestStation software version 6.4 and the custom functional tests utilizing the CAN Bus. The CAN bus tests were generated in Labwindows/CVI and structured in a DLL format. The Dynamic Programming Extension contains special functions that support the communication between the TPG and the functional tests developed using LabWindows/CVI or Microsoft Visual Studio C/C++. In this way, the TPG may perform both standard In-circuit tests using the TestStation instruments and functional tests using external PXI instruments.



Figure 1: ICT Fixture for UUT

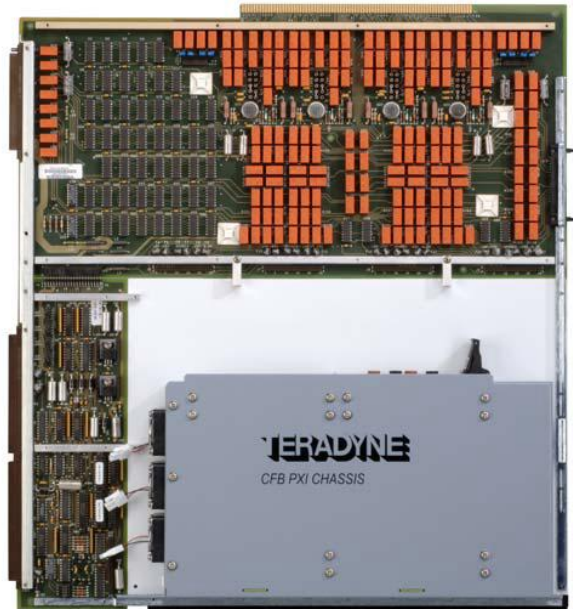


Figure 2: TestStation PXI Expansion Board



Figure 3: Goepel PXI 6181 Programmable Communication Instrument



Figure 4: Connecting a PXI Instrument to the relay matrix

Results of the Integration

By utilizing the using the PXI Expansion board and the Dynamic Programming Extension, the user was able to fully integrate upstream functional test and programming processes on the TestStation, eliminating the need for these upstream steps. This resulted in several significant benefits:

- Doubling the throughput of the combined ICT/Functional test as compared with separate ICT and functional test stations
- Reduction in the number of functional test stations on the line, reducing costs due to procurement, maintenance and calibration of these stations
- Elimination of test operators at functional test stations and with it, the additional cost and handling of the UUTs
- Reduction of floor space required for ICT and functional test
- Increased test coverage at ICT, allowing defects to be detected earlier in the process, reducing repair costs

This combined test process has been in place for nearly a year and continues to provide the intended benefits, to the extent that the customer has now standardized on this integrated test philosophy for future products.

Additional Information

Additional information on the TestStation Functional Expansion Board and the Dynamic Programming Extension (DLL support) option may be found at the Teradyne website www.teradyne.com or by contacting your Teradyne representative.

For detailed documentation on the Dynamic Programming Extension option and the TestStation Functional Expansion Board please refer to the TestStation Test Language Reference Manual, TestStation PXI Expansion Board User's Guide, and various Applications notes, all which may be found on Teradyne eKnowledge.