

Johnson Controls Successfully Evaluates AUTOSAR

Concepts with Vector Software

Vector AUTOSAR Prototype Package

Burscheid/Stuttgart, 2007/10/26 – Johnson Controls has completed its first prototype system utilizing the Vector AUTOSAR Prototype Package. Johnson Controls, is one of the world’s leading suppliers of automotive interior systems, electronics, and batteries and is an AUTOSAR premium member. This project consists of multiple electric control units (ECUs) utilizing two different hardware platforms which are connected through a CAN network. The project combines several purposes which result in the migration of the current software architecture to an AUTOSAR profile: Evaluation of AUTOSAR basic software, memory size, and CPU load; automatic code generation; and integration of external software components.

The evaluation of the AUTOSAR concepts included several different goals. First, Johnson Controls took into consideration the development process and the AUTOSAR methodology. Software architecture design using AUTOSAR compliant tools was performed using the DaVinci Tool Suite from Vector. This approach provided a complete understanding of the AUTOSAR methodology and included much of the development normally performed at the OEM.

Another important goal of the project was complete integration of the basic software supplied by Vector with its complex device drivers and its own application software. Johnson Controls enabled this integration through the use of the AUTOSAR run-time environment (RTE). There were three different categories of application software: first, the legacy code which had to be adapted to fulfill the RTE interfaces. Secondly, automatic code

generation for the development of AUTOSAR software components utilizing third-party tools which were also compliant to the AUTOSAR standard. Thirdly hand-coded software components which were integrated into the demonstrator.

Different inputs and outputs of the microcontrollers were used to evaluate the hardware drivers. These included analogue-to-digital converters for the temperature input, digital I/O for buttons, pulse width modulation for dimming control among others, internal and external watchdog management, GPT (General Purpose Timer), SPI (Serial Peripheral Interconnect) communication, and NV (Non Volatile) memory management through external EEPROM. The LCD was controlled through the integrated complex device driver utilizing direct memory access.

To validate this system design, the ECU's (Body Controllers and Display) were first integrated into a PC simulation that also ran the hardware independent components of the AUTOSAR stack from Vector. The hardware interface, which is part of the simulation environment, was previously developed by Johnson Controls and has been used extensively over the past years.

Currently Johnson Controls is in the process of completing a production level ECU using the Vector AUTOSAR Prototype Bundle in order to compare performance and footprint of existing solutions with the AUTOSAR solution.

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