

Flash programming via CAN requires supplier's flexibility

By Peter Liebscher (Vector Informatik)

A lot of flexibility is demanded of automotive suppliers in the development of electronic components. This also applies to the area of Flash programming. Constraints in the various phases of the product life cycle, which in some cases may vary widely, each require differentiated handling. Besides realizing new optimization potential by their own inventiveness, suppliers now also have more powerful tools available to them.

ECUs need to be reprogrammed and analyzed more or less frequently over the various phases of a vehicle ranging from development to production to operation in the target vehicle to diagnostic analysis of returned product. Once the ECU has been installed in the vehicle, CAN is the only means of accessing it. In the development phase too the CAN bus is utilized as an interface for exchanging software. For suppliers the basic challenge is to achieve the most rational flow in their own development and production phases and satisfy the (strict) requirements of the vehicle OEM.

The solution approach of the company Continental Automotive Systems (www.conti-online.com), for exam-



ple, involves creating their own OEM-specific Flash-loader for development and production phases and a customer-specific Flash-loader for the product operation phase. The production boot-loader is optimized for standardized in-house flash processes and is decommissioned at the end of the production process, so that in normal operation only the customer's Flash-loader is still active. For the supplier this eliminates potential compatibility problems between the production boot-loader and the customer's flashing process.

Since the topic of security plays an important role in Flash programming in the vehicle operation phase, all

security mechanisms for integrity, authenticity, copy protection, etc. come into play here. These aspects are gaining in importance, because Continental has the capability of reactivating the production boot-loader to analyze returned product. Therefore, in reactivation precautions are taken to ensure that unauthorized persons cannot exploit this indirect path to manipulate or spy data.

A specific application at Continental involves reprogramming a multiprocessor system with master and slave controllers and external sensors. The master controller can be flashed directly by CAN; however the slave and sensors can only

be addressed indirectly in flashing. To gain control over the entire Flash process given the described constraints, the Stuttgart-based company Vector Informatik, a specialist in developing automotive electronics, was hired to implement a special extension. This extension is capable of utilizing the serial IPC (Interprocessor Communication) connection between the master and slave in Flash programming.

In this project a Flash tool with a hard-coded Flash procedure is still employed, but the future belongs to flexible standard tools with which the numerous challenges of the Flash process can be managed much more rationally at the supplier. The advantage of parameterization using tools such as CANape and CANdito from Vector is that all information relevant to the Flash process can be saved in standardized flash data containers. Use of the ODX Flash format as a future de-facto standard enables data exchange with other tools. At the same time required diagnostic data are stored in the container that might be generated with the CANdelaStudio program of the same producer.

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Vector Informatik (www.odx-solutions.com) provides a tool for diagnostic testing, Flash programming and measurement data acquisition in the area of motor vehicle diagnostics, the CANdito version 2.0. Developers may read data di-

ODX-compatible diagnostics tool

rectly from the standardized ODX 2.0.1 format use the automatic control of Flash jobs using ODX-F containers. This provides an ODX-compatible diagnostic tester for executing diagnostic

functions, such as reading the ECU ID or fault memory. Using the Script Editor, the user can develop Flash jobs and execute them automatically by ODX-F containers or semi-automatically tak-

ing user inputs into consideration. The transferred data may be compressed to reduce execution time of the Flash process.

The tool supports parallel flashing of multiple ECUs and offers functional addressing. (mm)