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FLASH SOLUTIONS
BY SOFTING

SOTA

PROXIMITY PROGRAMMING

MANUFACTURING | REPAIR SHOP | CUSTOMER

FLEET TESTING

CALIBRATION

SYSTEM TESTING

ECU ENGINEERING
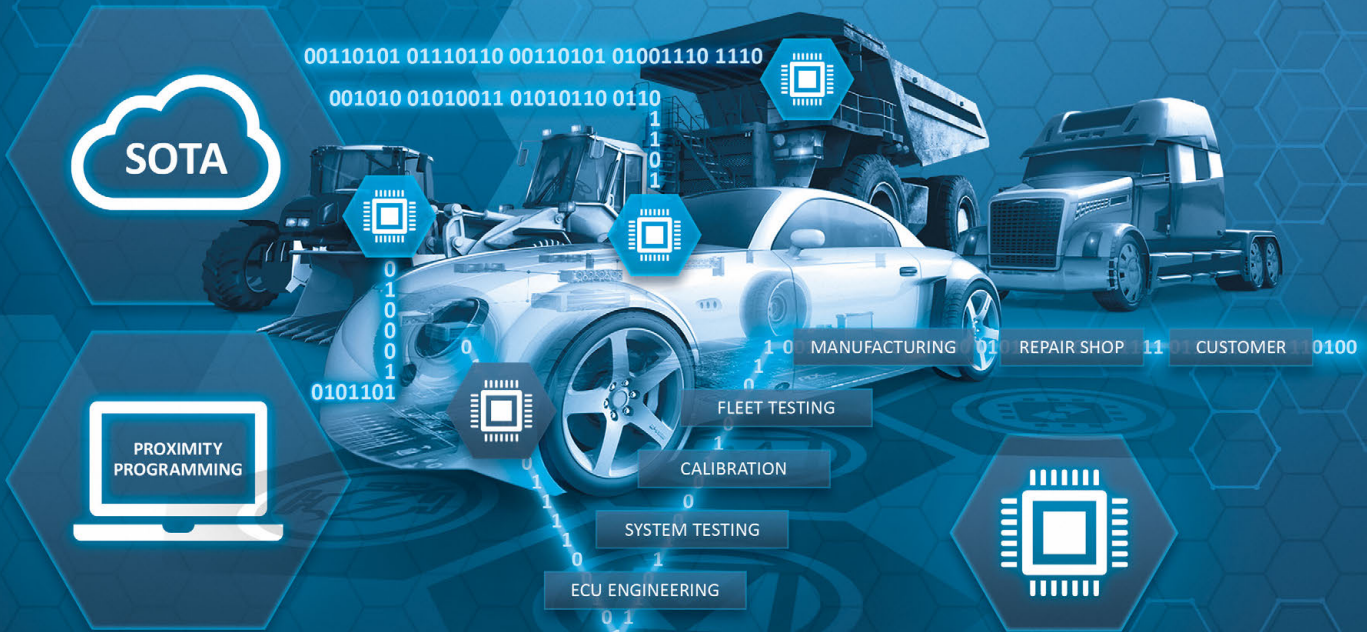
RELIABLE UPDATES OF ECU SOFTWARE
OVER THE ENTIRE VEHICLE LIFE CYCLE

Softing's flash solutions allow ECUs to be supplied with new software in engineering, manufacturing and after vehicle delivery in the repair shop or directly in the customer vehicle – simply, quickly and efficiently. Over-the-Air updates even make it possible to update vehicles remotely. And the parallel flashing of several vehicles is also possible. The smart system architecture enables simple adaptation to the changing vehicle architecture: direct ECU access, vehicle programming via a gateway and processing by a diagnostic system in the vehicle always take place via the same components. This makes the successful management of emerging challenges in terms of performance, data sizes, processes and security possible.

AREAS OF APPLICATION

- Engineering
  - Coding ECU functions, parameterizing functions, updating ECU software
  - Parallel and uniform updating of different test benches
  - Remote supply of vehicles in the prototype workshop with new software
- Manufacturing
  - Import of the current software version on the line
  - Updating in post-production
- After-sales
  - Correction of software errors
  - Adaptation of software functions
  - Activation of new functions (providing hardware installed)

BENEFITS

- Simple fixing of software errors
- Fast retrofitting of software functions
- Avoidance of costly recalls
- Scalable solution architecture for maximum performance and flexibility
- Remote flashing as the basis for software over-the-air (SOTA): processes independent of location and time
- Powerful security mechanisms for access protection, data and communication
- High-quality, robust solutions adapted to the respective application
- Easy integration of sequences once developed into further applications

SCALING THANKS TO SMART ARCHITECTURE – MAXIMUM FLEXIBILITY FOR EVERY CASE OF APPLICATION

To ensure that data can be used consistently throughout the life cycle, a three-part software architecture has become established for test systems. This consists of uniform protocol implementation, a uniform runtime environment for diagnostics and the applications, including engineering testers, diagnostic testers and individual OTX implementations for the relevant case of application. In our solutions, the software layers can be distributed variably to the hardware components (PCs and VCIs) used, depending on the individual requirements.

FAST, SIMPLE FLASH PROGRAMMING IN ENGINEERING

ECU test directly on board assembly or ECU
- Programming tool on the laptop
- Integrated diagnostic runtime system
- VCI connected with laptop over USB (or WiFi)

- Frequent updates of sub-areas of software or data
- Efficient handling decisive
- Depending on the engineering phase, logistics and security less important

HIGH-PERFORMANCE, SECURE FLASH PROGRAMMING IN MANUFACTURING

Vehicle is programmed on the production line
- Host computer monitors editing and data supply
- Diagnostic runtime system on the VCI works semi-autonomously
- VCI connected with the host computer via LAN/WiFi

- Predefined data is imported in the line section
- Programming possible in a few line sections
- Focus on performance and secure data transmission
- Logistics of great significance

ENGINEERING

PRJ
Softing SDE Runtime System

USB

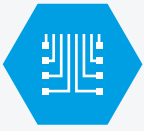**MANUFACTURING**

LAN

PRJ
Softing SDE Runtime System

Solution examples, other combinations possible.

SECURITY – CHALLENGE AND PREREQUISITE FOR FLASH PROGRAMMING

Security is an integral part of all Softing solutions without important aspects such as performance being sacrificed. A high degree of security can be obtained with suitable access rights, sustainable licensing as well as the use of modern encryption methods on the side of the tester application, the data stored and the communication links.

Encryption is also the keyword for ODX and OTX data necessary for flash programming. The security level can be increased with additional encryption at protocol level. Furthermore it is necessary for suitable processes and tools to prevent access by unauthorized persons, as well as operating and/or programming errors. This is why our tools make it possible to configure user rights for all kinds of roles, e.g. for the application engineer, the flash programming expert or the head of the repair shop.

DTS MULTIFLASH –
SAVING TIME EIGHTFOLD

Road test, manufacturing preparation, test bench maintenance: It is often the case that several programming tasks have to be taken care of at the same time. With DTS Multiflash, up to eight vehicles can be updated simultaneously in connection with the VIN|ING 2000 as a smart VCI – i.e. with an integrated diagnostic runtime system. It is irrelevant whether these are available at the same location or remotely. It is also possible to process different vehicle types at the same time.

REPAIR SHOP

CUSTOMER

Cloud Application

WiFi

4G/5G

PRJ

Softing SDE Runtime System

SCALABLE, SECURE SOFTWARE UPDATES IN THE REPAIR SHOP

Vehicle comes to the repair shop for service/repair
- Diagnostic runtime system integrated in the vehicle or VCI
- Diagnostic tester connected with the vehicle/VCI over WiFi

- Predefined campaigns are proposed or software updates used for repairs
- New vehicle functions are acquired
- Focus on secure data transmission
- Logistics for invoicing of central importance

DIRECT CUSTOMER ACCESS WITH UPDATE CAMPAIGNS IN THE CLOUD

Vehicle dials in at home or at hotspots
- Diagnostic runtime system integrated in the vehicle
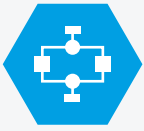- After data download controlled by the cloud, the vehicle owner triggers the programming

- Predefined campaigns managed in the cloud
- New vehicle functions possible via webshop
- Integration in vehicle operation necessary
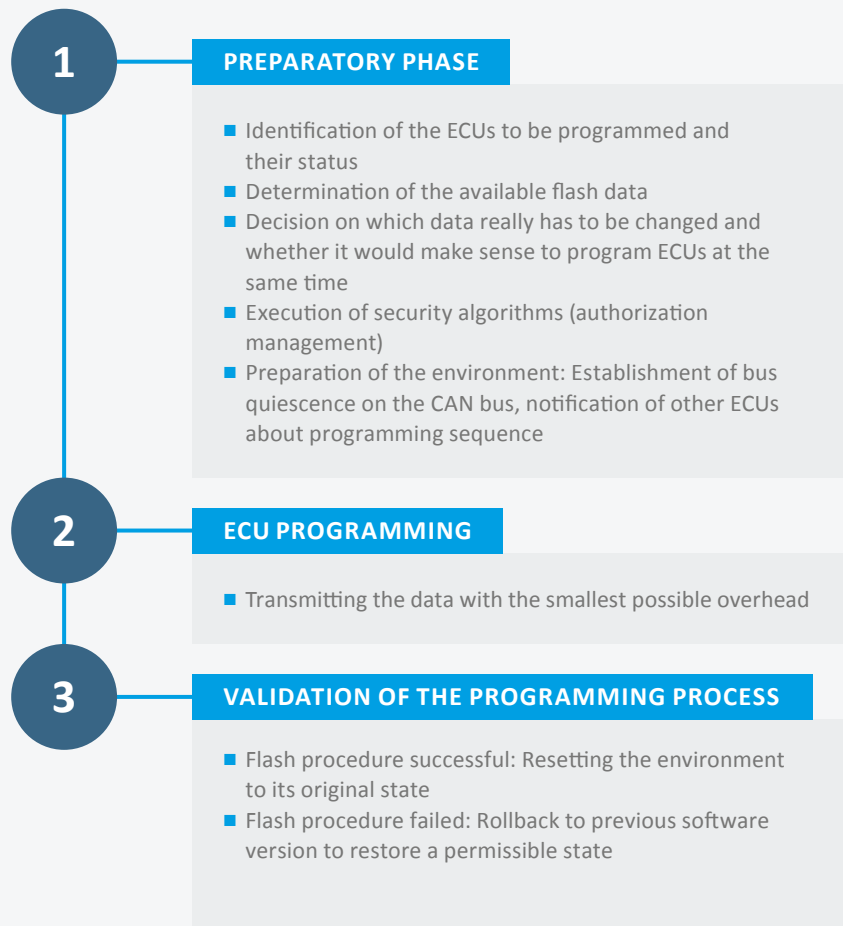- Focus on secure data transmission and error-free programming

REMOTE FLASH PROGRAMMING
FOR MAXIMUM EFFICIENCY

The integration of the diagnostic runtime system in the vehicle enables simple remote diagnostics in combination with a Telematic Control Unit (e.g. the xTCU of Softing subsidiary Globalmatix). This opens up new possibilities as early as the engineering stage. A test system, such as an HiL, Labcar or FMU, can thus be supplied with new software directly from the office. The same is true of vehicles in the prototype workshop. And test benches, many of which are now operated in other regions, can also be safely updated from any location.

After the vehicle is delivered to the end customer, SOTA (software over-the-air) is the magic formula. Critical errors in particular are easy to rectify as soon as the vehicle is in a safe condition and the driver agrees. This is beneficial for all parties if it prevents recalls.

SECURE, THREE-PHASE FLASH SEQUENCE

1 PREPARATORY PHASE

- Identification of the ECUs to be programmed and their status
- Determination of the available flash data
- Decision on which data really has to be changed and whether it would make sense to program ECUs at the same time
- Execution of security algorithms (authorization management)
- Preparation of the environment: Establishment of bus quiescence on the CAN bus, notification of other ECUs about programming sequence

2 ECU PROGRAMMING

- Transmitting the data with the smallest possible overhead

3 VALIDATION OF THE PROGRAMMING PROCESS

- Flash procedure successful: Resetting the environment to its original state
- Flash procedure failed: Rollback to previous software version to restore a permissible state

OVERVIEW OF FLASH SOLUTIONS FOR MAXIMUM EFFICIENCY IN ENGINEERING, MANUFACTURING AND AFTER-SALES

APPLICATIONS	
Softing DTS.monaco	Flash workspace in the engineering tester Softing DTS.monaco to hedge various software versions, but also to prepare the automated flash sequence for manufacturing and after-sales service
Softing TDX.studio	Creating intuitive flash sequences for the repair shop tester Softing TDX.workshop
Softing OTX.studio	Creating flash sequences for dedicated application cases

VEHICLE INTERFACES & MIDDLEWARE	
Softing SDE	Smart Diagnostic Engine – runtime system for diagnostic functions, sequences and services over the entire life cycle
VIN|ING 2000	High-performance VCI throughout the entire vehicle life cycle for fast and secure flash programming (prerequisite: runtime system installed on host PC)
VIN|ING 2000 Softing SDE	Autonomous programming solution consisting of VIN|ING 2000 with Softing SDE installed on it
VIN|ING 2000 Softing SDE xTCU (Globalmatix)	Flash programming over cloud application