A Flash Solution for Every Need
Agenda

- UDS Reprogramming of ECUs
  - ECU Reprogramming with vFlash
  - Use Case Overview
  - Summary
Overview

UDS Reprogramming of ECUs

ECUs with Bootloader

Bus System

Flash Tool

Application Area
- Development
- EOL Programming
- After-Sales Programming
Overview

UDS Reprogramming of ECUs

Flash Tool

communication usually via UDS

ECU

Application

Bootloader
(i.e. Programming session)

- General application which implements the general algorithms and diagnostic functions.
- Is usually implemented based on AUTOSAR.
- Bootloader (and flash driver) is used for reprogramming. Could also be implemented based on AUTOSAR components.

Purpose: Application and data is downloaded to the ECU’s persistent memory.
(at Development, Manufacturing, After-Sales)

An ECU runs EITHER in the application OR (exclusively) the bootloader.
Responsibilities

- **Flash Tool**
  - Controls the flash sequence
  - Transfers data to the ECU

- **Bootloader**
  - Manages the entire software update sequence
  - Erases the memory areas, transfers the new memory image to persistent memory
  - Verifies data integrity
UDS Reprogramming of ECUs

In OEM/Supplier Process

Development tester

Seldom reprogramming due to short manufacturing time. But ECU configuration is done here.

Manufacturing tester

Reprogramming mainly at supplier before ECU is delivered.

Service tester

Reprogramming here if ECU is replaced.
Agenda

UDS Reprogramming of ECUs

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ECU Reprogramming with vFlash

High Speed Reprogramming

- Supports different bus systems in **one tool**
  - CAN
  - CAN FD
  - FlexRay
  - LIN
  - Ethernet (DoIP)
  - Ethernet (SoAd)
Plugin Concept: vFlash Template for each Bootloader

- Easy startup
- Bootloader details covered by vFlash Template
- vFlash look-and-feel nearly independent of OEM/Bootloader
ECU Reprogramming with vFlash

Flash Data Sources

- Native: Pure memory image
- Container: Memory image AND process information
Extended Feature Set

- Custom Actions
  - ECU and customer specific operations before and after flashing

- Reporting
  - Individually document flash activities

- Force Boot Mode
  - Keep ECU in bootloader in case application software is invalid

- Integration into Test Configurations
  - DiVa diagnostic/flash validation
  - CANoe ECU tests
  - Runs on VN89xx and VT System
### Use Case: Production, Data Exchange

- Pack&Go Project packs all required items in one file (configuration, Seed&Key.dll, flashware, ...)

**ECU Reprogramming with vFlash**

vFlash Pack&Go Project
Agenda

UDS Reprogramming of ECUs
ECU Reprogramming with vFlash

- Use Case Overview

  Summary
Use Case: Development

- vFlash Project references flash data → automatic use of updated data
Use Case Overview

Automated Flashing

- Flash execution controlled via
  - Graphical user interface
  - Automation interface (C and C# API)
### Use Case Overview

#### Parallel ECU Reprogramming

<table>
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<tr>
<th>Use case: Parallel flashing</th>
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<tr>
<td>- Parallel flashing of several ECUs each over separate bus</td>
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<td>- In vehicle manufacturing or supplier assembly</td>
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<td>- Efficient reprogramming of identical and different ECUs</td>
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<td>- Applying late changes</td>
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<td>- Applying OEM specific adaptations to generic pre-programmed ECUs</td>
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#### Solution

<table>
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<th>Tool edition: vFlash Station</th>
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<td>- Concurrent flashing of up to 8 ECUs, each over a separate bus</td>
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<td>- Concurrent flashing over different bus types (CAN, CAN FD, FlexRay, LIN, Ethernet (DoIP))</td>
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<td>- Each flash process is controlled independently</td>
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Standalone Flashing with VN8810

- Supplier’s production:
  Wirelessly control several flash processes on several VN8810
- Manufacturer’s production:
  Late software update shortly before assembling module in vehicle
- After vehicle production:
  Reprogramming ECUs assembled in vehicle (e.g. while shipping vehicles)

Standalone Flash Device: vFlash on VN8810

- Fail-safe execution
- Controlled via keypad
- Optionally controlled wirelessly via “Smart Device”
- No PC required for flashing
- No expert required for flashing
- Documentation of flash activities in Reports
Remote Flashing

Use Case Overview

Remote Flashing

- **Expert / Developer**
- **Windows-PC**
- **vFlash Remote**
- **Flash Pack&Go**

- **Workshop Technician**
- **vFlash Access Point**
- **VN8810**

- **Test Driver**
- **Windows-PC**
- **vFlash Access Point**

- **Vector Service Gate**
- **Network Interface**
OTA Flashing

- vFlash engine running on in-vehicle HPC
- Cloud based flash campaign management
- SW package delivery based on vehicle identification features

- SW update is just one application of Vector vConnect
Summary

Flashing Solution for Every Need

Traditional Approach: External PC Tool

Standalone Flash Device

Remote SW-Update

Production flashing

OTA
For more information about Vector and our products please visit

www.vector.com

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