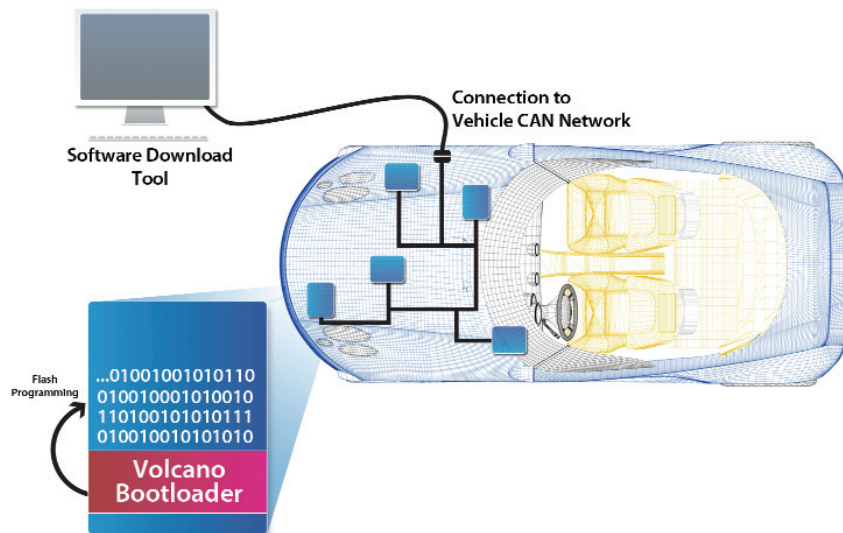


Volcano Bootloader



Overview of a complete software download system - Volcano Bootloader is the software component in each Electronic Control Unit (ECU) that enables receiving data over the vehicle's CAN network.

Use Cases

The Volcano Bootloader is a standalone program which enables software updates of any software module within the ECU – through the CAN (Controller Area Network) network. This functionality requires that the ECU has flash memory.

Typical usage of a Bootloader is

- Update of existing ECU software during service – no need to dismount the ECU from the vehicle in order to update its SW, which dramatically reduces cost of aftermarket changes.
- Reconfiguration or complete programming of ECU during manufacturing or service – reduces the need for keeping separate stocks of ECUs, both in case of production and aftermarket.
- Download of software and application data during development – speeds up unit and system testing.

Bootloader Strategy

Typically, the Bootloader is divided in two parts :

1. Primary Bootloader (PBL)
2. Secondary Bootloader (SBL)

The PBL is permanently placed in a protected boot sector and will execute directly after reset. The PBL acts as a communication engine to download the SBL into the internal RAM of the ECU and then activate it. The SBL adds functions for erase and programming of flash memory and EEPROM; it also handles the actual download of new or updated software. This strategy allows a minimum ROM utilization by the PBL.

Major Product Features

- Enables software updates through software downloads through the CAN connection
- Optimized microcontroller resource utilization (ROM)
- High download performance
- Protection against overwriting of Bootloader ROM (optional)
- Easily integrated with application software
- Configuration according to custom ECUs

Technical Specifications

- ISO 14229-1, ISO 15765-2 and ISO 15765-3 compliant
- Security Access (according to ISO 14229-1) available
- Typical memory utilization 10-12kB ROM
- Also as KWP2000 compliant deliverable

Integration

Ease of integration comes from the Volcano Bootloader's standalone executable program. Mapping the interrupt vector table and reserving the flash segment for the Volcano Bootloader is all that is required.

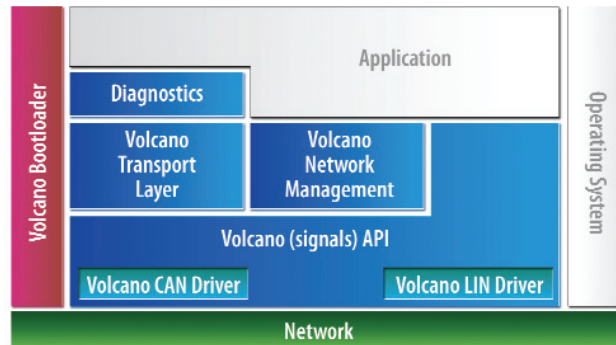
Supported MCUs	
C167CS	Star12
CR16	ST10F272/273
HC08	TC1766
HC908	TC1775
HC912	TMS470
MC68376	XC164
MPC561	

List of currently supported MCUs. Mentor Graphics provides support for other MCUs on customer request.

Availability

Protocols from complete car OEM-specific to standardized protocols using ISO 15765-2 transport layer and ISO 14229 diagnostic services is available. A KWP2000 compliant bootloader is also available.

The Volcano Bootloader is available in many microcontroller types from different vendors and may also be configured to customer ECU requirements (e.g. watchdog, transceiver, etc.).



Volcano Bootloader is a standalone program that can be used to reprogram the other parts of ECU software and configuration data.

The following services (defined by ISO 14229) are supported for software download and upload within the Volcano Bootloader:

Service	Use of Service for Software Download
Diagnostic Session Control	The tester requests the ECU to enter the programming mode
ECU Reset	The tester requests the ECU to perform a reset (and therefore exit the programming mode)
Security Access	Unlock the ECU for download/upload
Read Data By Identifier	The tester requests the ECU to report identification information
Write Data By Identifier	Write ECU configuration data (e.g. hardware part number, serial number)
Routine Control	Activate the secondary bootloader. Erase flash memory
Request Download	Request download to ECU RAM Flash or EEPROM
Request Upload	Request upload from ECU RAM, Flash or EEPROM
Transfer Data	Transfer data to/from ECU RAM, Flash or EEPROM
Request Transfer Exit	Exit transfer of data to/from ECU

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