

## DProbeHC12 Support for Flash Programming in Automotive Applications

Development of automotive applications is getting more and more complex. Up to 40 microcontrollers, all linked by a CAN or J1850 network, make driving in modern cars more comfortable and safe. Interaction of the distributed systems makes development more difficult and error prone. To upgrade or change the firmware of the distributed systems, it's necessary to have an electrical erasable, nonvolatile memory such as EEPROM or Flash EEPROM. Motorola's 16-Bit HC12 microcontroller family perfectly meets these requirements. Derivatives like the MC68HC912D60 or MC68HC912DG128 offer both EEPROM and Flash EEPROM. There is no need to have external Flash memory since the DG128 has 128k Bytes of internal Flash EEPROM, which is enough for most automotive applications.

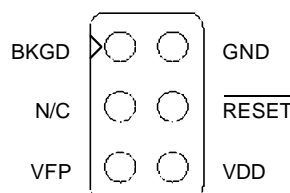
The internal Flash of the DG128 is spread up into eight 16k-pages. Four of them have an 8k protected boot block. With the protected boot block it's even possible to support in-field upgrade of the controller's firmware<sup>1</sup>.

Equipped with Motorola's single-wire Background Debug Mode interface, Hitex's DProbeHC12 in circuit emulator supports programming of the internal EEPROM or Flash EEPROM of all HC12 derivatives.

The DProbeHC12 has a built-in charge pump voltage converter to generate the 12V programming voltage for the Flash. It's not necessary to have a voltage converter on the target board, since the DProbeHC12 provides the Flash programming voltage. The target board is connected by a flat cable to the standardized (see below) BDM-interface of the DProbeHC12 and the application is downloaded by the HiTOP user interface.

Since the DProbeHC12 is a full-featured, non-intrusive emulator, the DProbeHC12 also provides all benefits of an in circuit emulator like 512k emulation memory, hardware breakpoints, trace memory and complex triggers. With the combination of a BDM-Debugger, Flash programmer and in circuit emulator, the DProbeHC12 is a "one for all" solution for HC12 development.

**Figure 1: BDM connector target layout**



<sup>1</sup> For further information about in-field upgrade, refer to the MC68HC912B32/D technical summary or application note EB183/D