

Aktennotiz



von Stefan Haimerl

I/EE-74 Unsere Org.-Einheit/Zeichen
40901 Hausruf +49 (0)8 41 89-
84 40901 Telefax +49 (0)8 41 89-
stefan.haimerl@audi.de E-Mail

13. August 2003 Datum

Mode 09 - CVN Software Calibration Verification Number

AUDI AG
85045 Ingolstadt
Deutschland

- **One CVN** ist utilized for each control unit (ECM/TCM).
- For ECMs a **CRC-32 algorithm** is used to calculate the CVN.
For TCMs a **CRC-16 algorithm** is used to calculate the CVN.
- For all control units the area of memory for each CVN calculation includes the **all emission-related software and calibration data**.
The boot block and hardware production information is excluded from the calculation (e.g. ECU individual serial number).
 - ECM ME7.x: Hardware production information*) is excluded from the CVN calculation.
 - ECM ME9.x: The StartUpBlock (for start routines and flash programming) and hardware production information*) is excluded from the CVN calculation.
 - ECM SIMOS 6: The BootBlock is excluded from the CVN calculation.
 - TCM CVT: The BootBlock is excluded from the CVN calculation.
 - TCM 5HPxx: The complete Flash is included in the CVN calculation.
 - TCM 6HPxx: The BootBlock, hardware production data*), and EEPROM emulation area is excluded from the CVN calculation.
- *) *hardware production information, e.g. ECM/TCM individual serial number, etc.*
- The CVN is calculated **in background loops** of the ECM/TCM (also when engine is running). The calculation starts with ignition on.
- The CVN is calculated only **once per driving cycle** (not on demand via Mode 9).
- The duration for the CVN calculation is
 - when key on - engine off: approx. 60...120 sec.
 - under worst case conditions: approx. 120 - 240 sec.
- The calculated **CVN result is stored** in the battery-buffered RAM until the CVN is subsequently updated.
Every calculation of the CVN overwrites the existing CVN.
(TCM CVT: The CVN ist stored in the EEPROM, as no battery-buffered RAM is available.)
- If the calculation is not finished by the time of Mode 9 request, the stored CVN result from the previous driving cycle will be reported.
- When a CVN value is actually stored in the ECM/TCM (battery-buffered RAM or EEPROM) the stored CVN value is **available via Mode 09 for immediate access** (also when engine is running).
- The stored CVN value is not erasable when the fault memory is erased by a GST or during normal vehicle shut down (key off – engine off)
- A reprogramming event will erase the stored CVN value (set to \$00).
At the very first time after a reprogramming event or a battery disconnect the required behavior described in ISO15031-5 chapter 4.1.4 is applied. (As long as no valid CVN is available \$78 will be sent to Scan Tool „Request Correctly Received – Response Pending“).