



# ChipLoaderNG

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## Module [51] Bosch MEDC17 - Bench

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### Content

<b>Purpose</b>	<b>2</b>
<b>Limitations</b>	<b>2</b>
<b>Necessary equipment</b>	<b>2</b>
<b>Automatic power management</b>	<b>3</b>
<b>Checking data for writing</b>	<b>3</b>
<b>Processor type identification</b>	<b>4</b>
<b>ECU identification</b>	<b>6</b>
<b>Read Flash / EEPROM memory</b>	<b>8</b>
<b>Write flash memory</b>	<b>8</b>
<b>Write EEPROM memory</b>	<b>9</b>
<b>Extract password from firmware</b>	<b>10</b>
<b>Disabling digital signature control for writing via OBD2</b>	<b>11</b>
<b>Features of working with ECU using a processor without OTP areas in flash memory</b>	<b>13</b>
<b>Features of some ECUs when using the CHIPSOFT GPT adapter</b>	<b>14</b>
<b>Possible problems and solutions</b>	<b>15</b>

# Purpose

The module is designed to work with Bosch ME (D) 17 / EDC17 (CPU Tricore) ECUs on a table, without disassembling ECUs and performing the following operations:

1. [Tricore processor Identification](#)
2. [Reading ECU internal and external flash memory](#)
3. [Writing ECU internal and external flash memory](#)
4. [Reading the internal eeprom memory of Tricore](#)
5. [Writing Tricore internal eeprom memory](#)
6. [Extract password from firmware](#)
7. [Disabling digital signature control for writing via OBD2](#)

The following Tricore processor types are supported:

1. TC1762
2. TC1766
3. TC1792
4. TC1796
5. TC1724
6. TC1767
7. TC1797
8. TC1782
9. TC1793

Supported external flash memory S29CD016G, S29CD032G, installed in conjunction with the processor Tricore TC1796.

# Limitations

Not currently supported:

1. Read, write external flash memory in ECU EDC17CP54, MED17.7.5, MED17.7.3.1
2. Work with ECUs that do not have internal flash memory
3. Bosch ECUs set on Chinese vehicles
4. Part of ECUs that have a high version of TPROT (MED17.5.5, MED17.1.1)

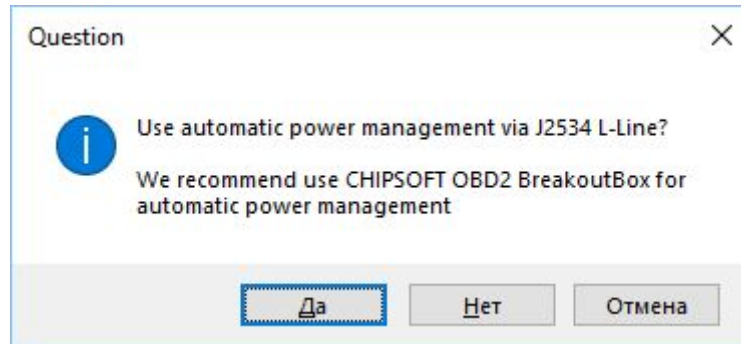
# Necessary equipment

To work with the module, the following equipment is required:

1. CHIPSOFT J2534 adapter (Acrylic / Lite / Mid / Pro). Adapters manufactured before the fall of 2019 need to be upgraded. Upgrade of the adapter is described in a separate document. The firmware and adapter driver version must be at least 1.5
2. CHIPSOFT GPT adapter. Adapters with the Rev.A PCB need to be upgraded and reflashed; adapters with the Rev.B PCB do not require any additional preparations. Upgrade and reprogramming of the GPT adapter is described in a separate document.
3. Optional CHIPSOFT OBD2 BreakOut Box

# Automatic power management

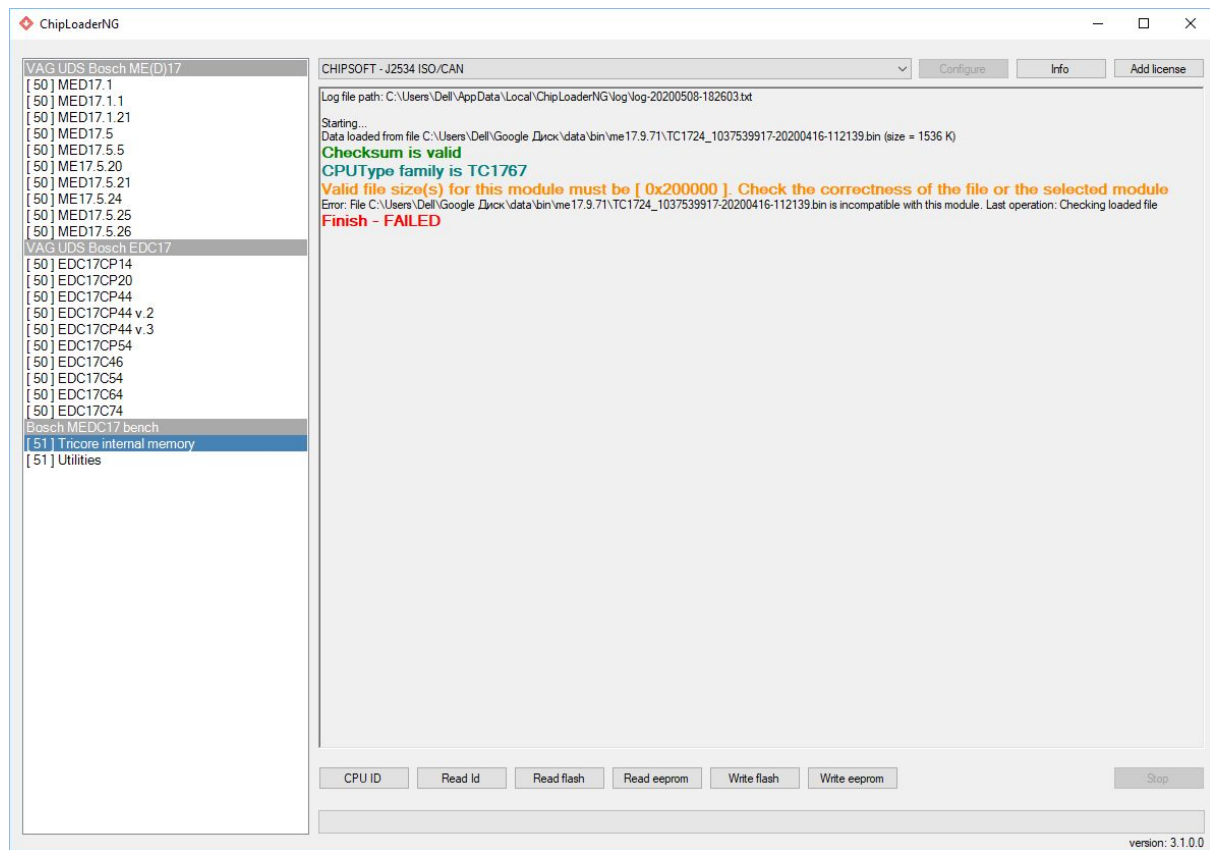
The module can use both automatic and manual ECU power management. Power is controlled by shorting the L-Line CHIPSOFT J2534 adapter to ground. For automatic power management and convenient connection to the ECU, we recommend using the CHIPSOFT OBD2 BreakOut Box. When you start working with the ECU, the program will ask you the preferred way to manage power.



It is possible to choose both manual and automatic power management. During read and write operations, the program can reboot the ECU several times by removing / supplying power.

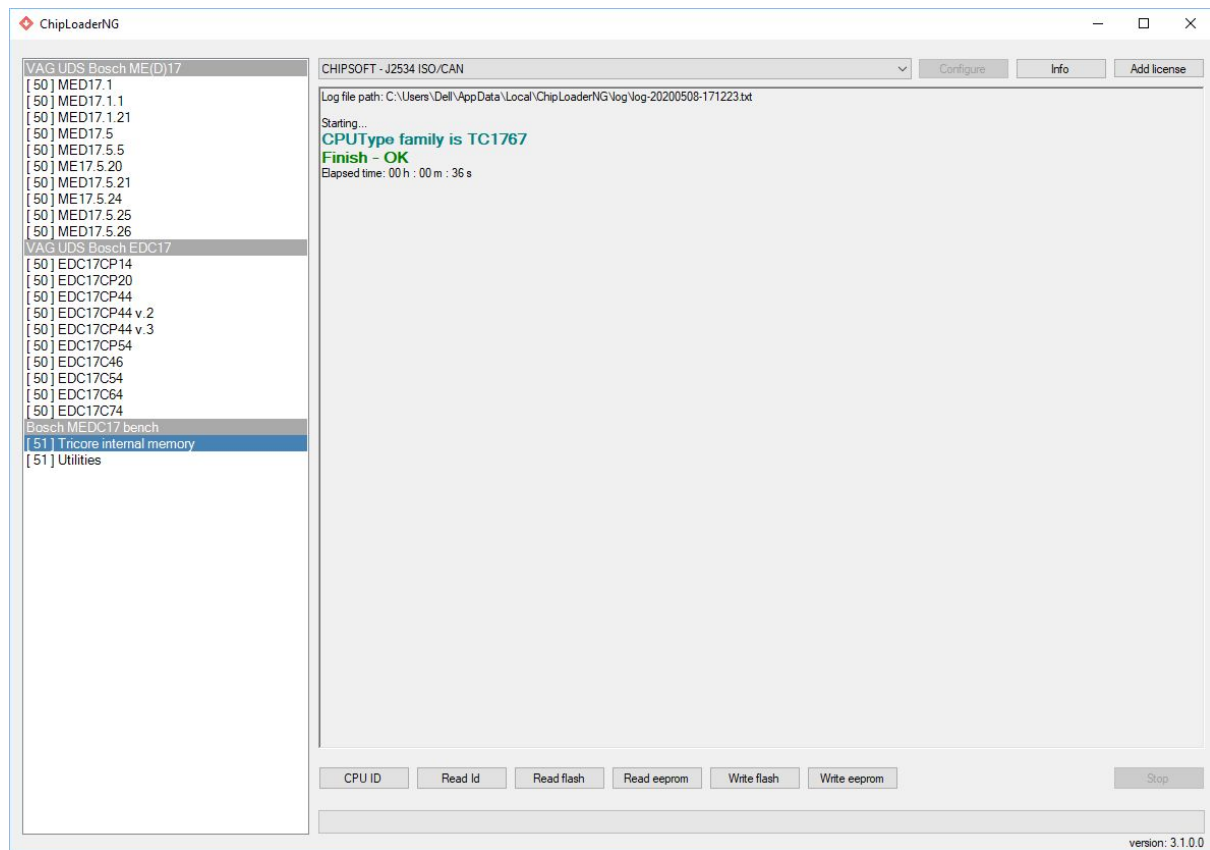
## Checking data for writing

The program performs various checkings for the firmware file before it is written. If, for some reason, the program considers the file incorrect, it will display a message about it.

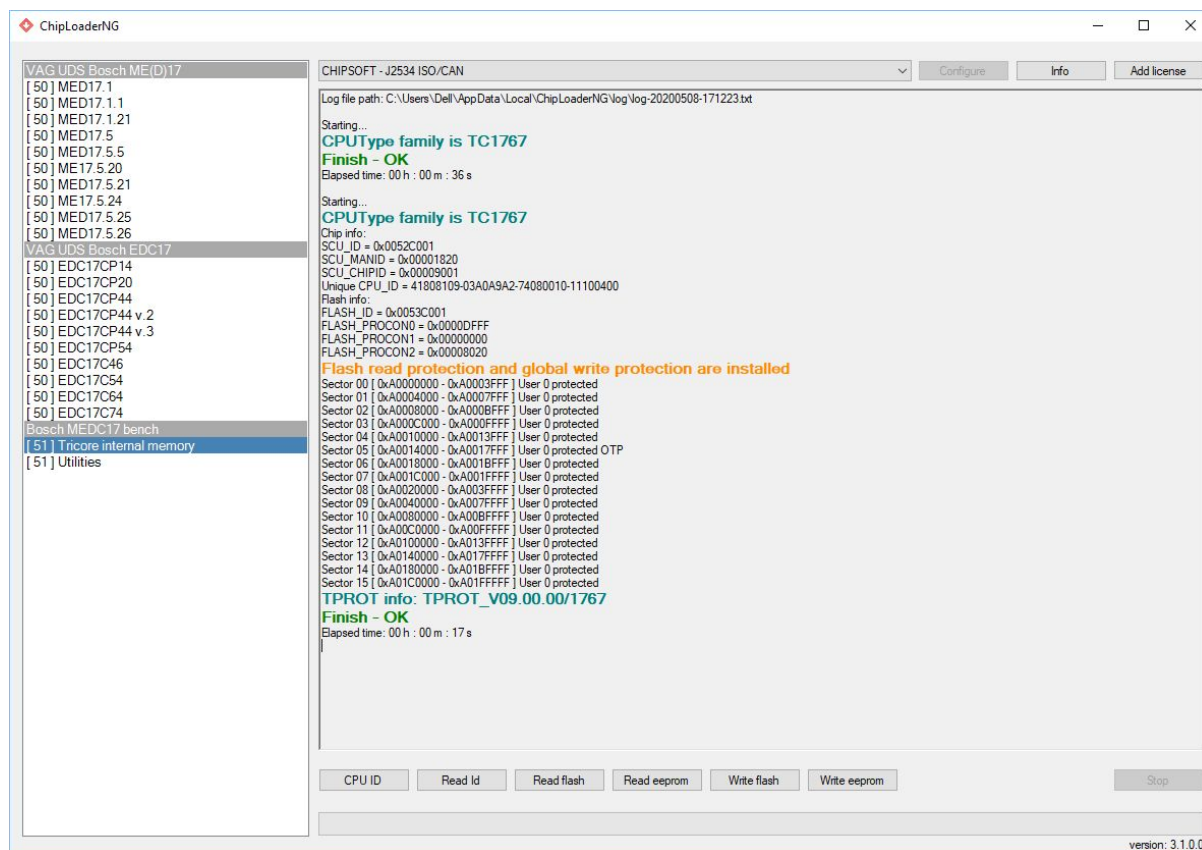


## Processor type identification

The **CPU ID** operation is available without a license for the module and can be used to check the operability of equipment when working with the module.



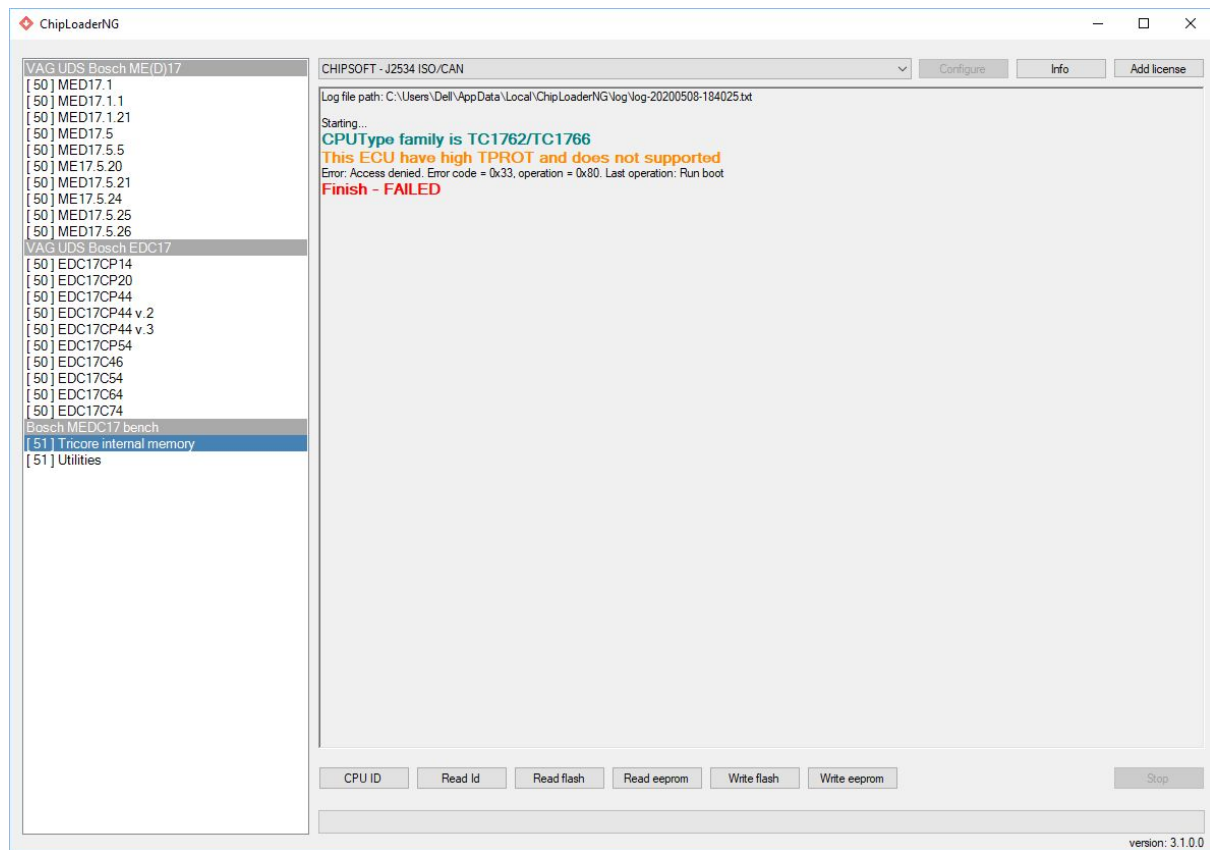
# ECU identification



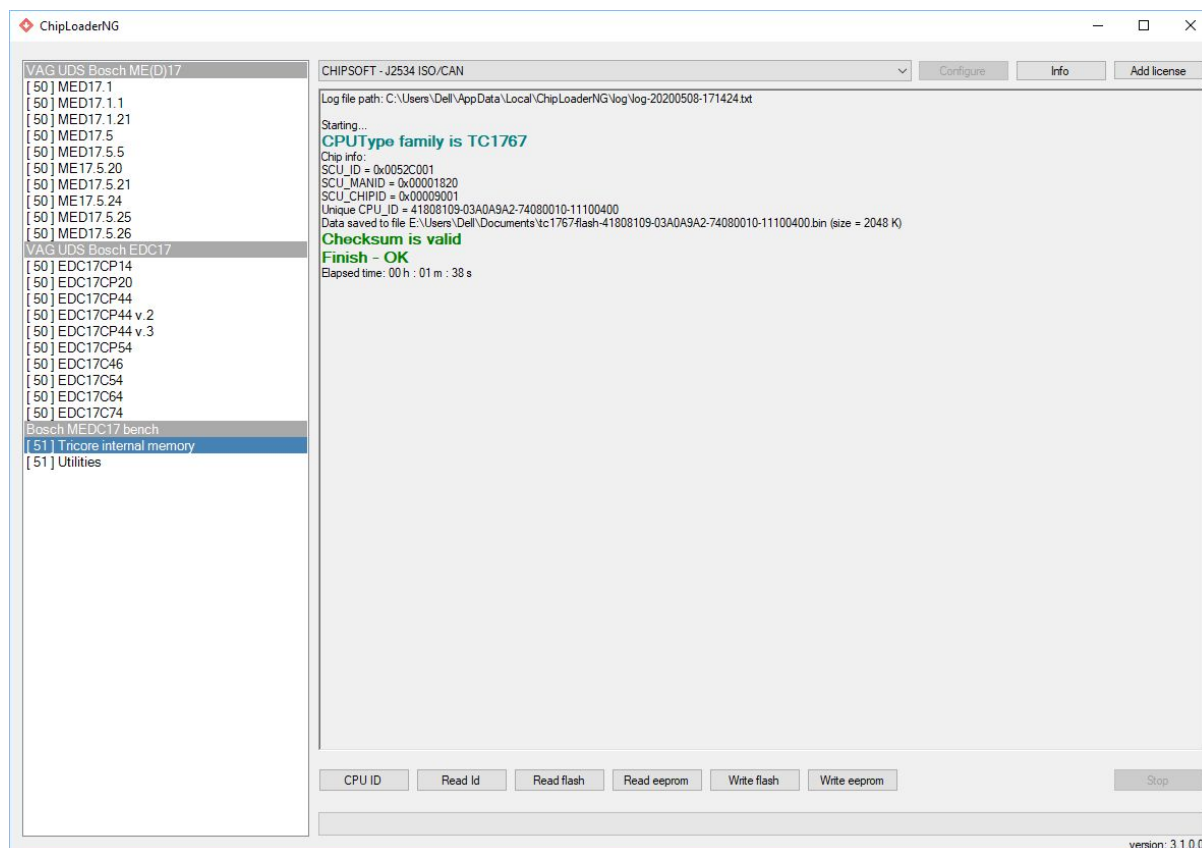
The **Read Id** operation is used to display detailed information about the ECU processor:

1. Unique processor number
2. The value of some registers
3. Memory maps and its characteristics
4. Versions of TPROT used

If the connected ECU has a high version of TPROT and is not supported by the program, a corresponding message will be displayed.



# Read Flash / EEPROM memory



The operation **Read flash**, **Read eeprom** reads a full dump of the internal memory of the processor. For a saved file with a memory dump, the processor type, memory type and the unique processor serial number are used as the file name.

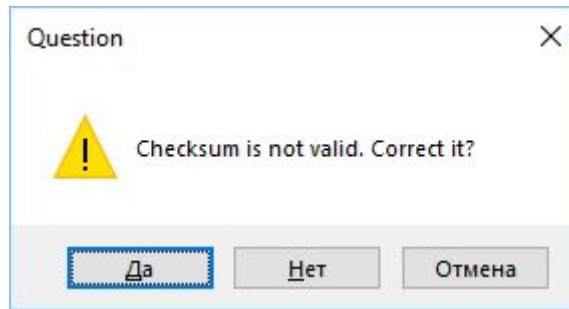
After the process of reading flash memory is completed, the program checks the correctness of the checksums in the read memory dump and displays the corresponding message.

## Write flash memory

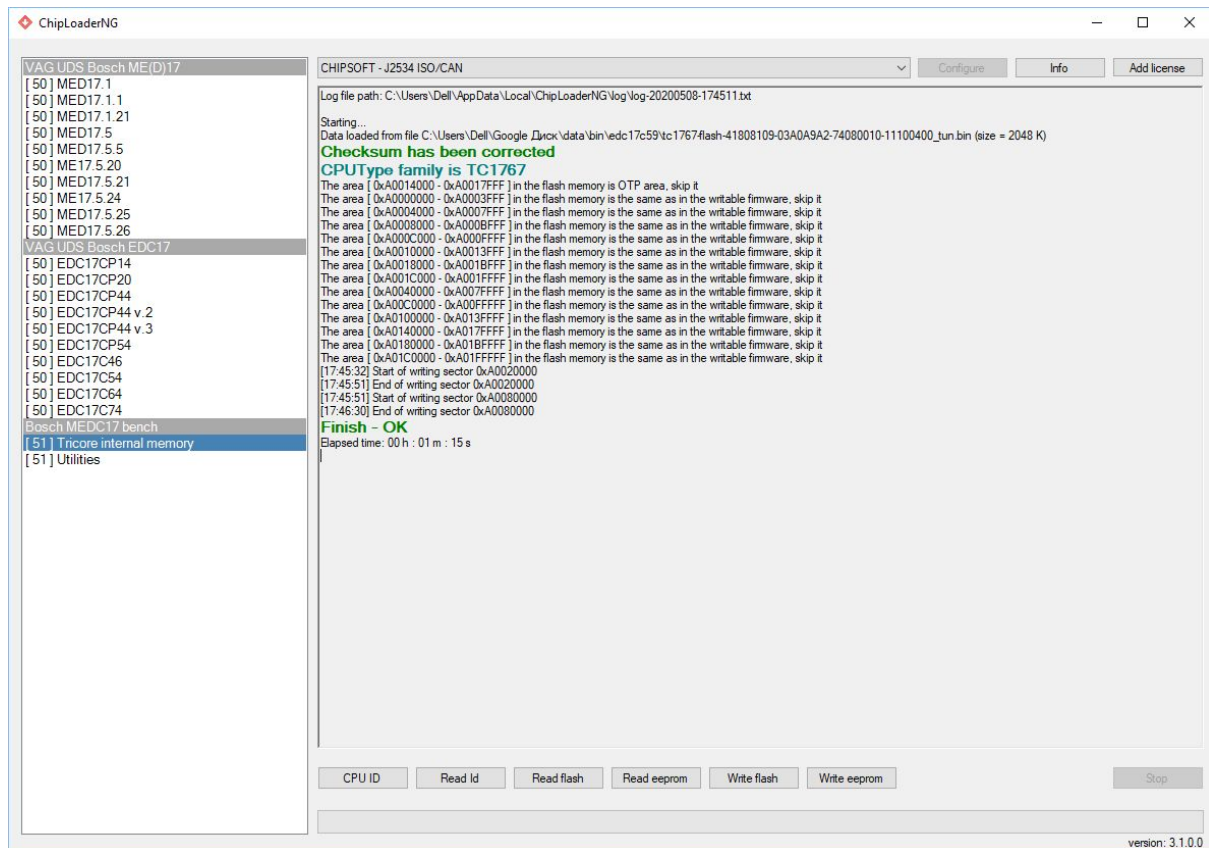
The **Write flash** operation writes all writeable sectors, excluding OTP sectors (once programmable memory sectors). An intelligent writing algorithm is used, in which only sectors that differ from those in flash memory are overwritten. This allows you to both speed up the writing process and make it safer if the connection with the ECU is disconnected during writing.

Before starting to write the programs checks the correctness of the memory dump which is being written and also checks the correctness of the checksums. If the checksums are incorrect, the program will offer to correct them:





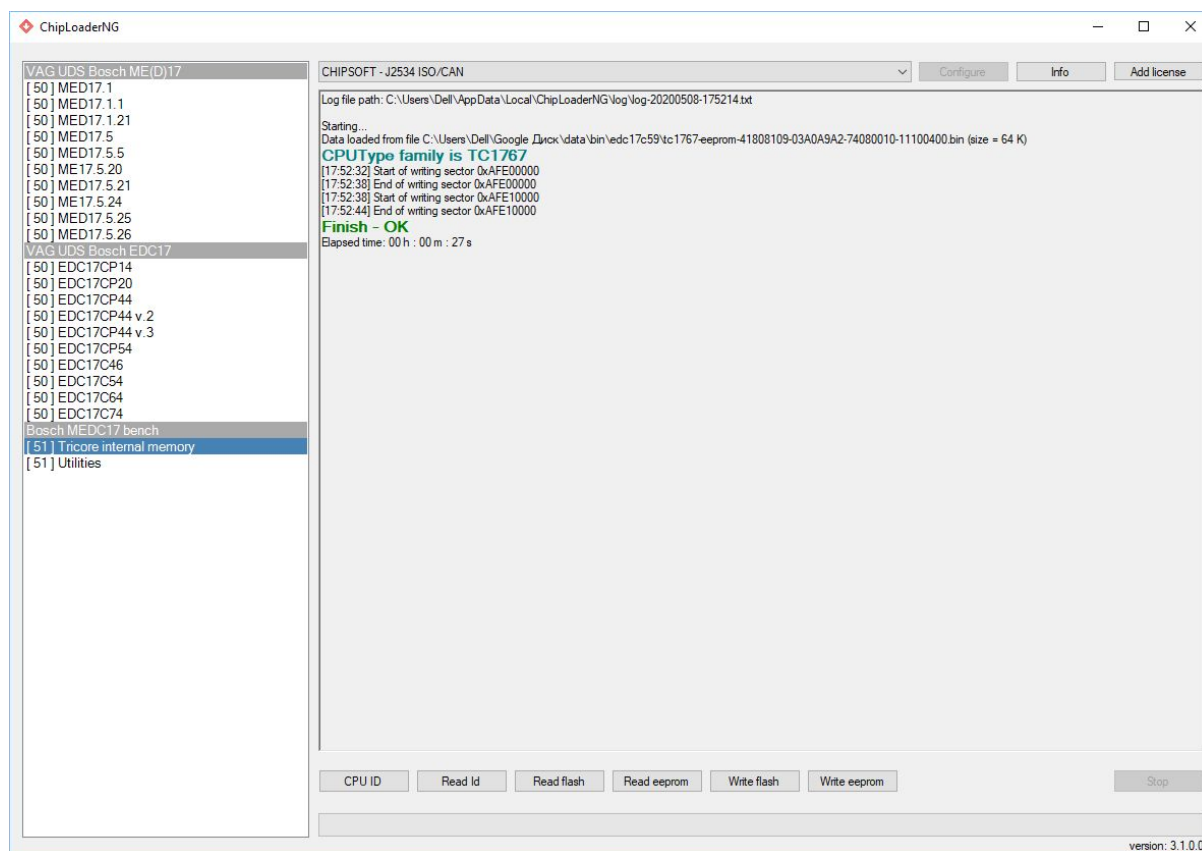
When writing, the program displays complete information on all written sectors (which sectors were skipped as OTP areas and which sectors were skipped, because their contents are equivalent to the written sectors).



Because of using an intelligent writing method, in some cases the writing time may be less than the reading time.

## Write EEPROM memory

The **Write eeprom** operation writes the internal EEPROM memory of the processor. In this case, an intelligent writing algorithm is not used, unlike flash memory writing.

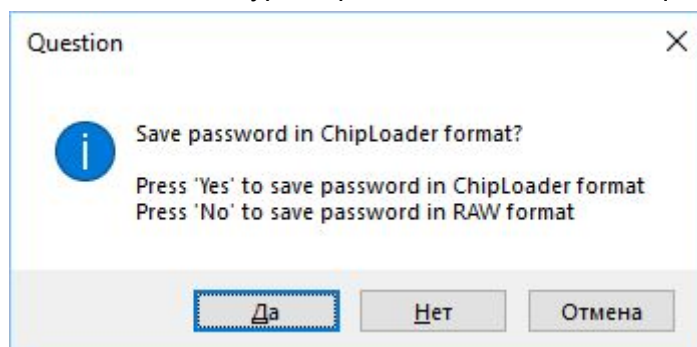


## Extract password from firmware

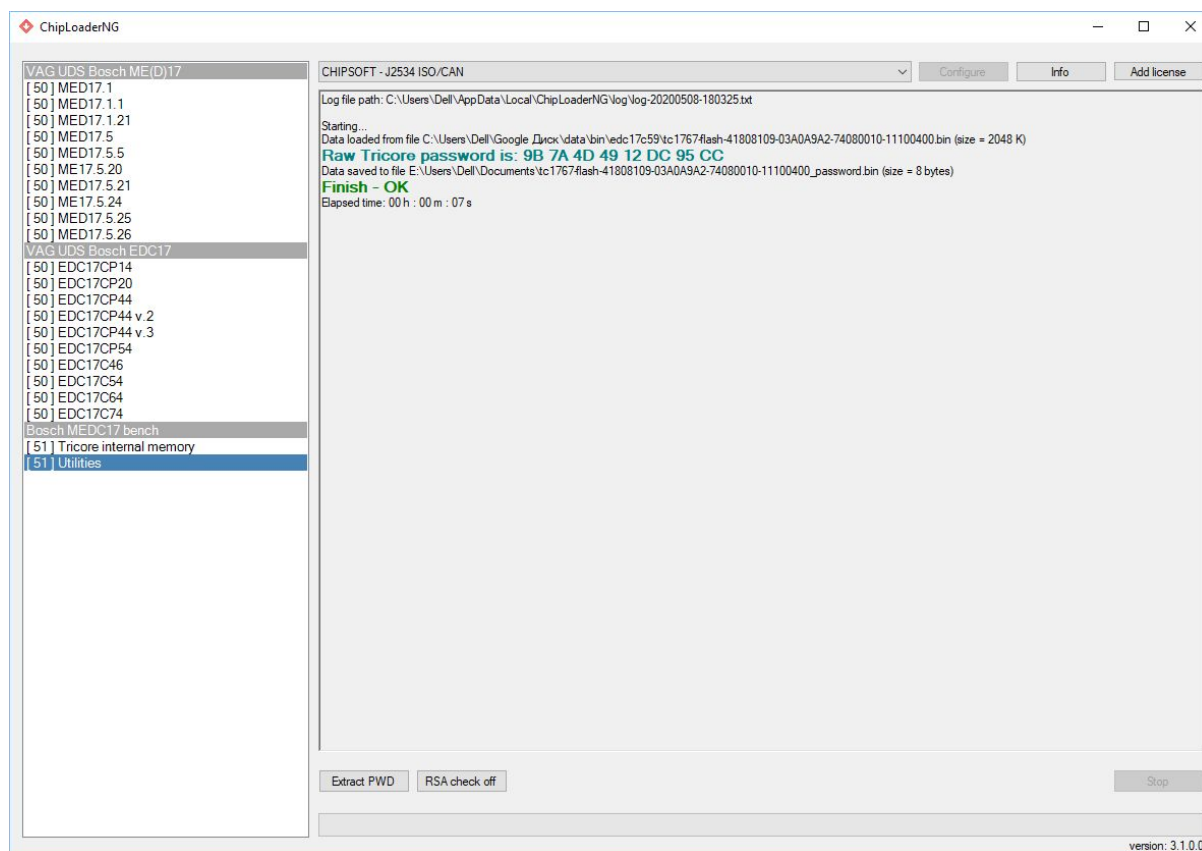
The **Extract PWD** operation extracts the password for accessing the Tricore processor from the binary file (for those binary files where the password is stored in them). The extracted password can be obtained in the following views:

1. Text view
2. As a file in ChipLoader format
3. As a RAW file

The program will ask the user for the type of password submission required:



The textual representation of the password will be displayed on the screen:

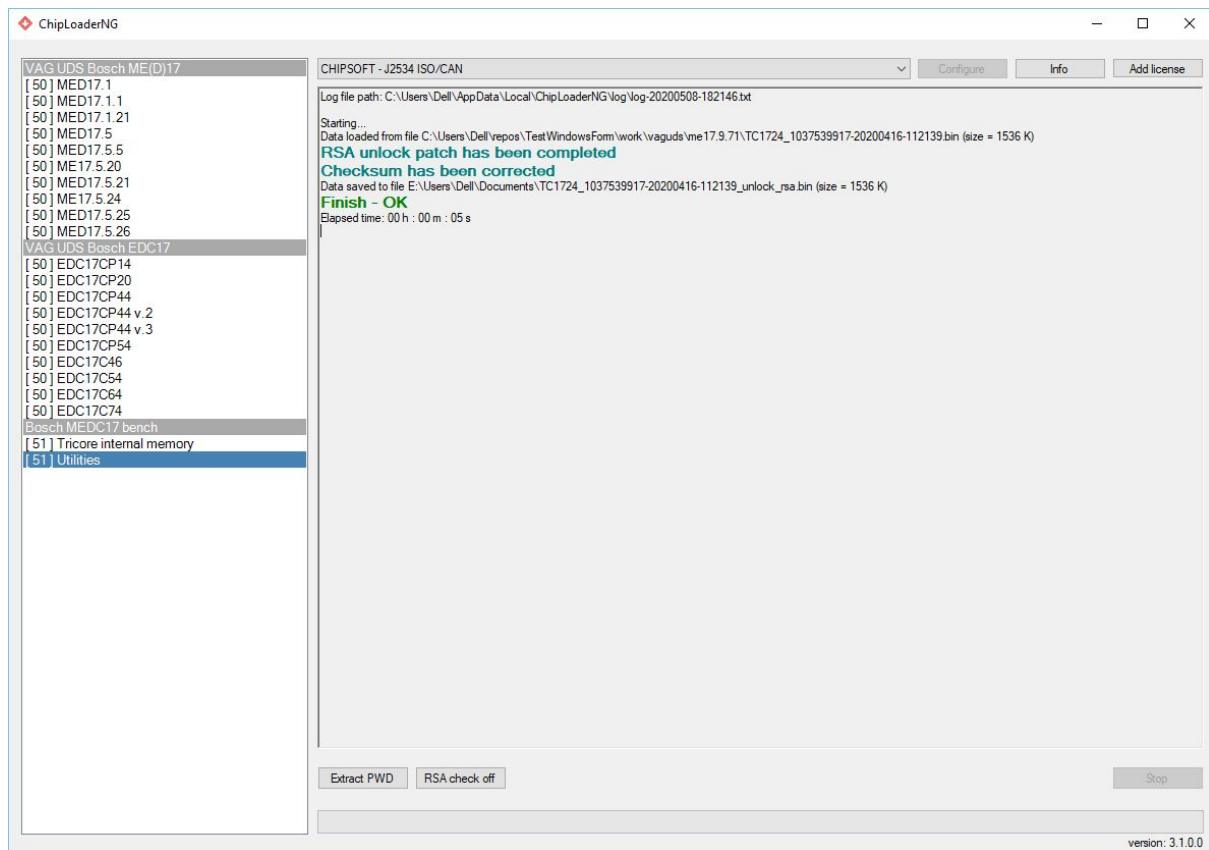


Passwords are saved in the firmware file only for those ECUs that use the protection algorithm of TPROT version 8 and higher. The version of TPROT used can be viewed by performing the [Read Id operation](#).

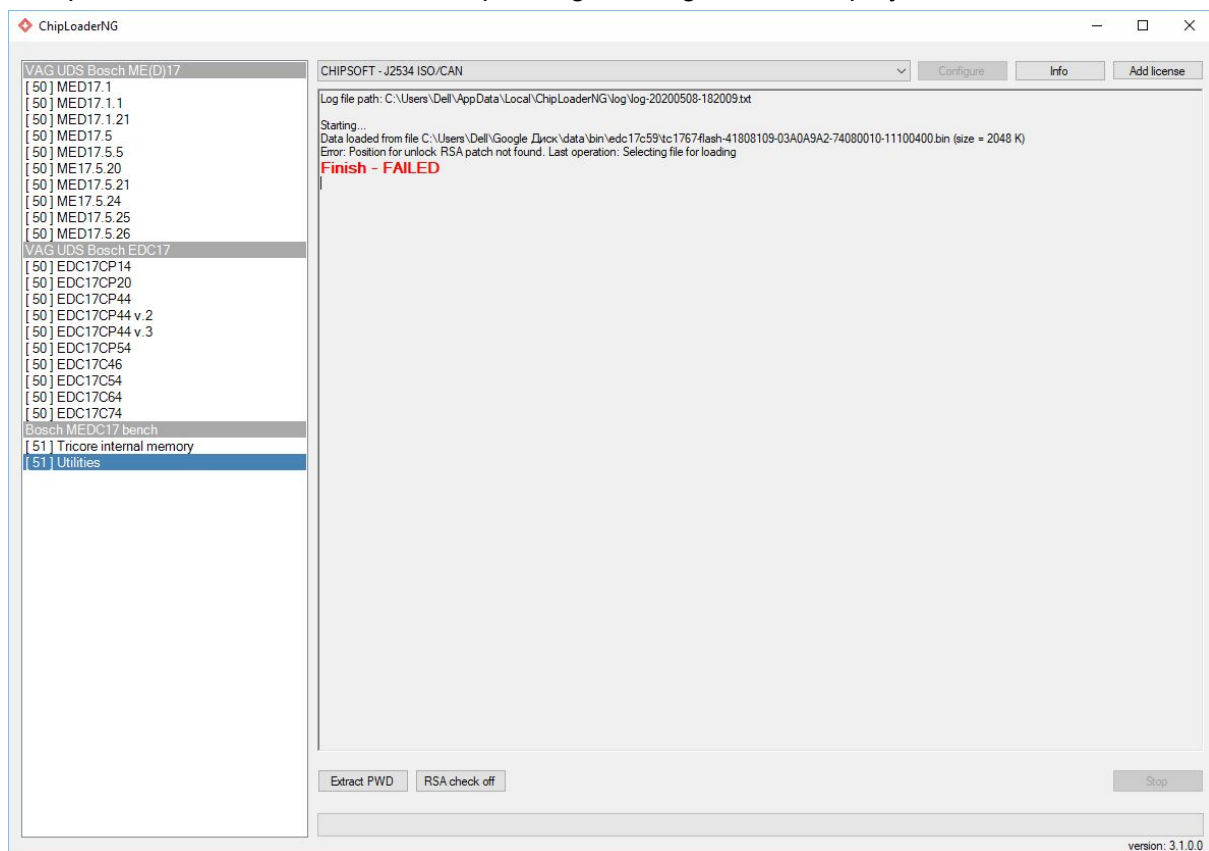
## Disabling digital signature control for writing via OBD2

The **RSA check off** operation makes the necessary changes to the firmware file so that in the future it will be possible to write firmware files with the wrong digital signature to this ECU via OBD2.

The result of this function will be a patched file with the checksum already recalculated.



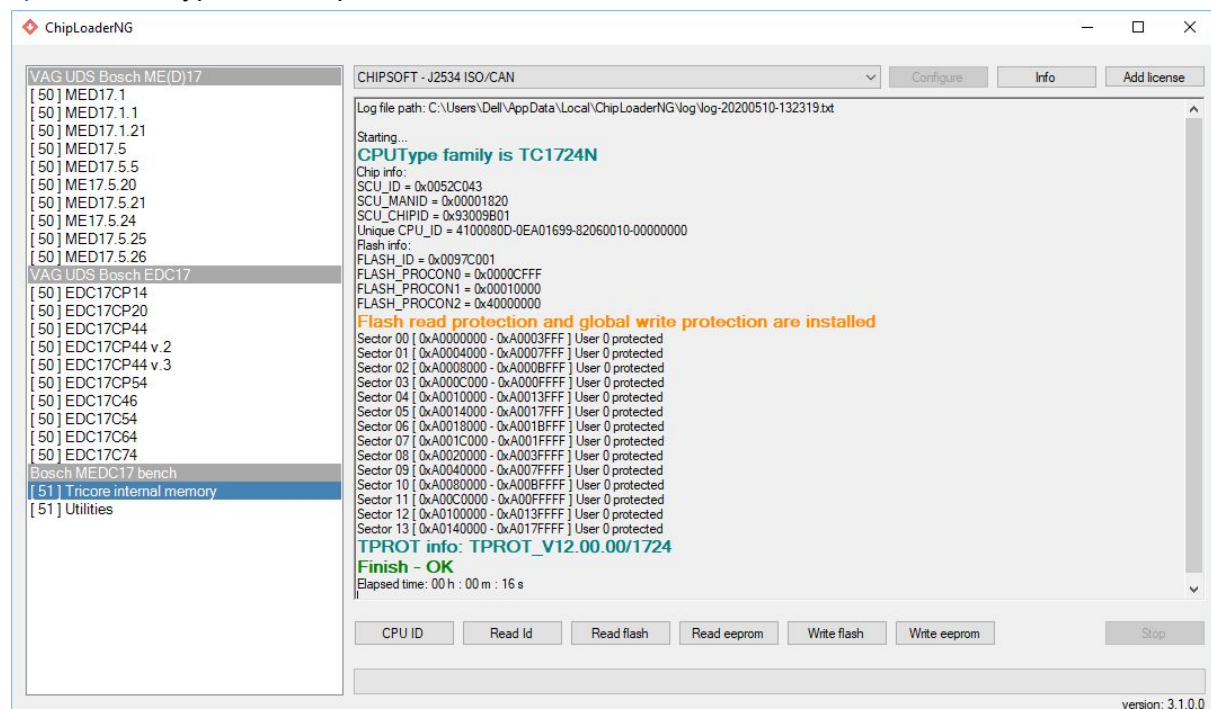
**Note!** This operation is not available for all the firmwares. If the operation is not available for the specified firmware file, the corresponding message will be displayed.



# Features of working with ECU using a processor without OTP areas in flash memory

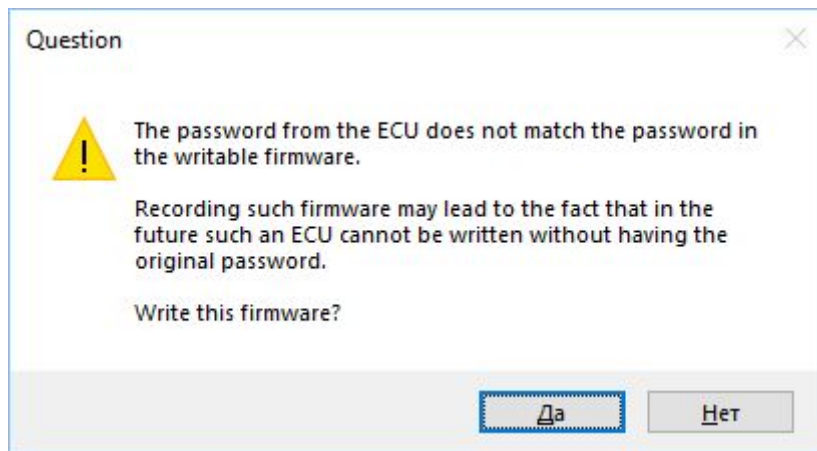
Some ECUs may have processors that do not contain OTP areas. When using TPROT 8 and above, this can be a problem when writing flash memory from another ECU. This section describes this particular situation.

The presence of OTP areas and the TPROT version can be seen by performing the [Read Id operation](#). A typical example of such an ECU is Bosch ME17.9.71:



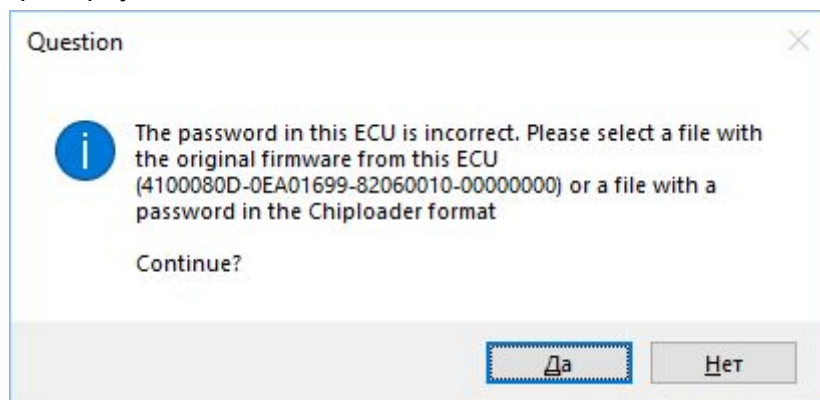
Problems can arise when overwriting the flash memory of an ECU with the firmware from another similar ECU. Taking into account that the firmware of each ECU is purely individual, the absence of OTP areas will lead to the fact that, when the flash memory is completely overwritten, a unique area, which includes the password for accessing this instance of the Tricore processor, will also be overwritten. Thus, in the future, control over the ECU may be lost and this will mean that it will not be possible to overwrite flash memory in the ECU. Having the original password for a specific instance of the Tricore processor, you can always restore full control over the ECU. Because since the original ECU firmware contains this password, it can be restored from the same firmware. **Therefore, always save a full flash and eeprom dump memory before doing anything with the ECU.**

If, during writing, the program sees that the password in the current firmware is different from the password in the firmware, which is being written, it will display a warning about that.



**“Yes”** should be selected only if rewriting the firmware restores the previous state of the ECU with the correct password. Otherwise, you need to select **“No”**, as control over the ECU will be lost in the future, but which can be restored if either the original firmware or the access key to Tricore is present.

If during the writing process the program sees that the password in the flash memory is incorrect, it will prompt you to force it.



You can set both the password itself and the original firmware from this ECU. At the same time, a unique identifier of the processor from which a password is needed is displayed in the window. When reading flash memory, the program adds a unique processor identifier to the file name to facilitate the search for the desired firmware.

A situation is possible when the ECU has already been written by someone before, the original original firmware is not available, and the unique firmware area contains a password from another ECU. In this case, control over the ECU is lost, rewriting flash memory or regaining control over the ECU will fail.

## Features of some ECUs when using the CHIPSOFT GPT adapter

Some ECUs do not contain internal pull up for pins GPT1 and GPT2 of ECU. It is because of this that connection with the ECU may not be established. To check it, it is enough to measure the voltage on the GPT1 ECU pin and the voltage on the GPT2 ECU pin, after applying voltage to the ECU. If the voltage on one of the pins is less than 3.3V, then it is

necessary to pull up this pin to the supply voltage of 3.3V through a 1K resistor. There are 3 separate pins on the CHIPSOFT GPT adapter (boot pins to 3.3V). For pulling up, just connect the GPT1 or GPT2 pins with a separate boot pin on the CHIPSOFT GPT adapter PCB.

It should be noted that the number of ECUs that do not have an internal pull up of the GPT pins is very small.

## Possible problems and solutions

Since the module uses an algorithm for working with an ECU to read and write previously embedded in the ECU firmware, incorrect firmware in the ECU can lead to the fact that this module will not be able to work with the ECU. This will be manifested in the fact that the **CPU ID**, **Read Id** operations will not be performed and will return an error. In this case, you can restore the ECU only with a module that works with the Tricore processor directly in boot mode. Depending on the version of TPROT used, you may need a password or the original ECU firmware to restore it.