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# BMW KeyCoder

Ultimate tool for  
BMW Car Access System

[www.bmw-keycoder.com](http://www.bmw-keycoder.com)

[www.autokeyprog.com](http://www.autokeyprog.com)

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# 1. Overview

## 1.1. Introduction

**BMW KeyCoder** software is the most powerful tool for tasks related with Car Access System (CAS<sup>\*</sup>) which is installed in all modern **BMW**, **Mini** and **Rolls-Royce** cars. The software can perform a wide range of tasks, and all of them can be done via OBD-II socket in seconds without disconnecting CAS from the car.

Why **BMW KeyCoder** is the best? Here are some examples:

- Programming of key – **now it's as simple as 1-2-3!** Select type of key, its position and start the programming!
- Programming of key is going **directly in the ignition lock!** No need for additional programmers and preparations of keys!
- Support of **latest technologies** from BMW:
  - 1) **EWS4 Secret Key** (new 128-bit synchronization with engine control unit). BMW documentation "says" that noone can read or write it, but we can do it through OBD-II socket! Surprise!
  - 2) **SOPT** (encryption of keys and synchronizations with engine control unit). Now the keys can be programmed even for encrypted CAS! And even with encrypted EWS4 Secret Key, and now it's the first software that can do it!
- Many **very useful functions** and all of them can be done via OBD-II socket!

## 1.2. Supported cars

**BMW KeyCoder** supports CAS modules installed on:

- **BMW 1 series**
  - E81 (2007 – present)
  - E82 (2007 – present)
  - E87 (2004 – present)
  - E88 (2007 – present)
- **BMW 3 series**
  - E90 (2005 – present)
  - E91 (2005 – present)
  - E92 (2006 – present)
  - E93 (2007 – present)
- **BMW 5 series**
  - E60 (2003 – 2010)
  - E61 (2003 – 2010)
- **BMW 6 series**
  - E63 (2003 – 2010)
  - E64 (2003 – 2010)
- **BMW 7 series**
  - E65 (2001 – 2008)
  - E66 (2001 – 2008)
  - E67 (2001 – 2008)
  - E68 (2005 – 2007)
- **BMW X1**
  - E84 (2009 – present)
- **BMW X5**
  - E70 (2006 – present)
- **BMW X6**
  - E71 (2008 – present)
  - E72 (2009 – present)
- **BMW Z4**
  - E89 (2009 – present)
- **Mini One, Cooper**
  - R55 (2007 – present)
  - R56 (2006 – present)
  - R57 (2008 – present)
- **Rolls-Royce Phantom, Drophead, Coupe**
  - RR1 (2002 – present)
  - RR2 (2006 – present)
  - RR3 (2009 – present)

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\* - all acronyms descriptions can be found in the Appendix

### 1.3. Supported CAS modules

**BMW KeyCoder** supports CAS modules modifications:

- CAS/ZAS
- CAS/ZAS RD
- CAS2
- CAS3
- CAS3+ (MCU: 9S12XDP512)

### 1.4. Features and possibilities

**BMW KeyCoder** allows performing wide range of tasks:

#### • Programming of keys via OBD-II

For CAS modules **produced in 2010+** or **updated by ISTA (up to 2.41.0\*)**:

- Keys or transponders can be programmed for **10-15 seconds**
- **No need to downgrade** CAS firmware
- CAS with **SOPT function (encrypted passwords of keys) are supported**
- **No need for original key** to program new key\*\*
- **No need for additional programmer** to prepare key

For all CAS modules:

- Programming of all keys and transponders **directly in the ignition coil!!!**
- All keys and transponders are supported (PCF7936, PCF7942, PCF7943, PCF7944, PCF7945, PCF7952)
- New keys can be programmed
- Used keys with known Immobilizer Secret Key (ISK) and password can be programmed
- Used keys can be transferred from other CAS or from CAS EEPROM dump
- Keys with Comfort Access (ID-transmitters) can be programmed
- **Full access to data of all keys** in CAS (*only in PRO version*)
- **Reading/writing of transponder memory and EEPROM of key directly in the ignition lock** (*only in PRO version*)

#### • Reading and programming of ISN\*\*\* via OBD-II

For CAS modules **produced in 2010+** or **updated by ISTA (up to 2.41.0\*)**:

- **No need to downgrade** CAS firmware
- CAS with **SOPT function (encrypted ISN) are supported**

For all CAS modules:

- ISN can be read and programmed via OBD-II

#### • Reading and programming of EWS4 Secret Key\*\*\*\* via OBD-II

For CAS modules **produced in 2010+** or **updated by ISTA (up to 2.41.0\*)**:

- **No need to downgrade** CAS firmware
- CAS with **SOPT function (encrypted EWS4 Secret Key) are supported**

For all CAS modules:

- EWS4 Secret Key can be read and programmed via OBD-II

\* - at the moment of BMW KeyCoder release the ISTA 2.41.0 is the last.

\*\* - for cars without EWS4 mode activated. For all cars - in the next update!

\*\*\* - ISN is the CAS-DME/DDE-EGS synchronization code, 3<sup>rd</sup> generation (EWS3).

\*\*\*\* - EWS4 Secret Key is the CAS-DME/DDE synchronization code (128-bit) used in newest cars, 4<sup>th</sup> generation (EWS4), used in CAS3, CAS3+. See the Appendix for description.

- **Restoring of Remote Control synchronization in the keys if it's lost**  
For all CAS modules:
  - SYNC value can be restored in key via OBD-II to make Remote Control and Comfort Access work again
- **Reading of ISN from DME via OBD-II**  
For DME modules MS45 and MSV70 and all CAS modules:
  - ISN can be read and transferred to CAS via OBD-II
- **Synchronization of CAS and DME/DDE**  
For all CAS and DME/DDE modules:
  - Start value can be stored in "virgin" DME/DDE module
  - ISN random code can be synchronized between CAS and DME/DDE if it's lost or after writing of ISN into CAS
- **Deactivation of EWS function in EGS via OBD-II**  
For all EGS modules with EWS function:
  - Deactivation of EWS function in paired CAS-EGS modules via OBD-II
  - Checking status of EWS function in EGS
- **Activation/deactivation of EWS4 mode via OBD-II**  
For all CAS modules with EWS4 mode support:
  - Activation of EWS4 mode in CAS via OBD-II to activate exchange between CAS and DME/DDE with support of EWS4 Secret Key
  - Deactivation of EWS4 mode in CAS via OBD-II to activate exchange between CAS and DME/DDE with support of ISN
- **Synchronization of CAS and ELV via OBD-II**  
For all CAS modules:
  - Electronic Steering Lock (ELV) can be synchronized with CAS via OBD-II
- **Programming of VIN via OBD-II**  
For all CAS modules:
  - VIN can be read and programmed via OBD-II
- **Verification of VIN "check digit"**  
For all CAS modules:
  - VIN can be checked – is it correct or not
- **Programming of User Information Fields (UIF) via OBD-II**  
For all CAS modules:
  - UIF (Date of last CAS reprogramming, VIN and Software number) can be programmed via OBD-II
- **Extracting and decoding of Vehicle Order (FA) from CAS and LM/FRM**  
For all CAS and LM/FRM modules:
  - Vehicle Order (FA) can be read and decoded via OBD-II
- **Increasing of amount of allowed ID-transmitters for Comfort Access**  
For all CAS modules:
  - Only 2 ID-transmitters can be used in the car by default. Max. amount of ID-transmitters can be increased via OBD-II (ex. if you want to add new key to the car with Comfort Access)

- **Blocking and unblocking of keys; setting of key memory number**

For all CAS modules:

- Every key can be blocked in case of key loss or unblocked again.
- Individual settings number for key can be changed (key memory)

- **Clearing of fault memory in the CAS**

For all CAS modules:

- Fault memory (DTC's) can be erased

- **Restarting of CAS firmware**

For all CAS modules:

- CAS firmware can be restarted in case of any faults in CAS work

Possibilities that will be fully functional in the nearest update:

- **Mileage correction in all CAS modules via OBD-II**

- **Modification of Vehicle Order (FA)**

- **Reading and programming of EEPROM of CAS3/CAS3+ via OBD-II (as it stored in MCU) (*only in PRO version*)**

## 2. Installation

### 2.1. Installing software

Just unpack the archive **bmw-keycoder.zip** to any folder and **BMW KeyCoder** software is ready to use.

Unpacked software should consist of files and folders:

- "Drivers" – folder with drivers for USB-to-OBD-II device
- "BMW-KeyCoder.exe" – BMW KeyCoder software
- "BMW KeyCoder user manual.pdf" – this manual
- "Car Access System.pdf" – the part of BMW documentation
- "Electronic vehicle immobilization 4.pdf" – the part of BMW documentation

### 2.2. Installing drivers

Connect USB-to-OBD-II device to OBD-II socket of the car to power-up the device. The "new hardware found" dialog will appear. Perform manual drivers installation from specified folder (for example: "C:\BMW-KeyCoder\Drivers").

Install process may differ in various Operating Systems (OS). See the examples of install process for your OS at:

<http://www.ftdichip.com/Support/Documents/InstallGuides.htm>

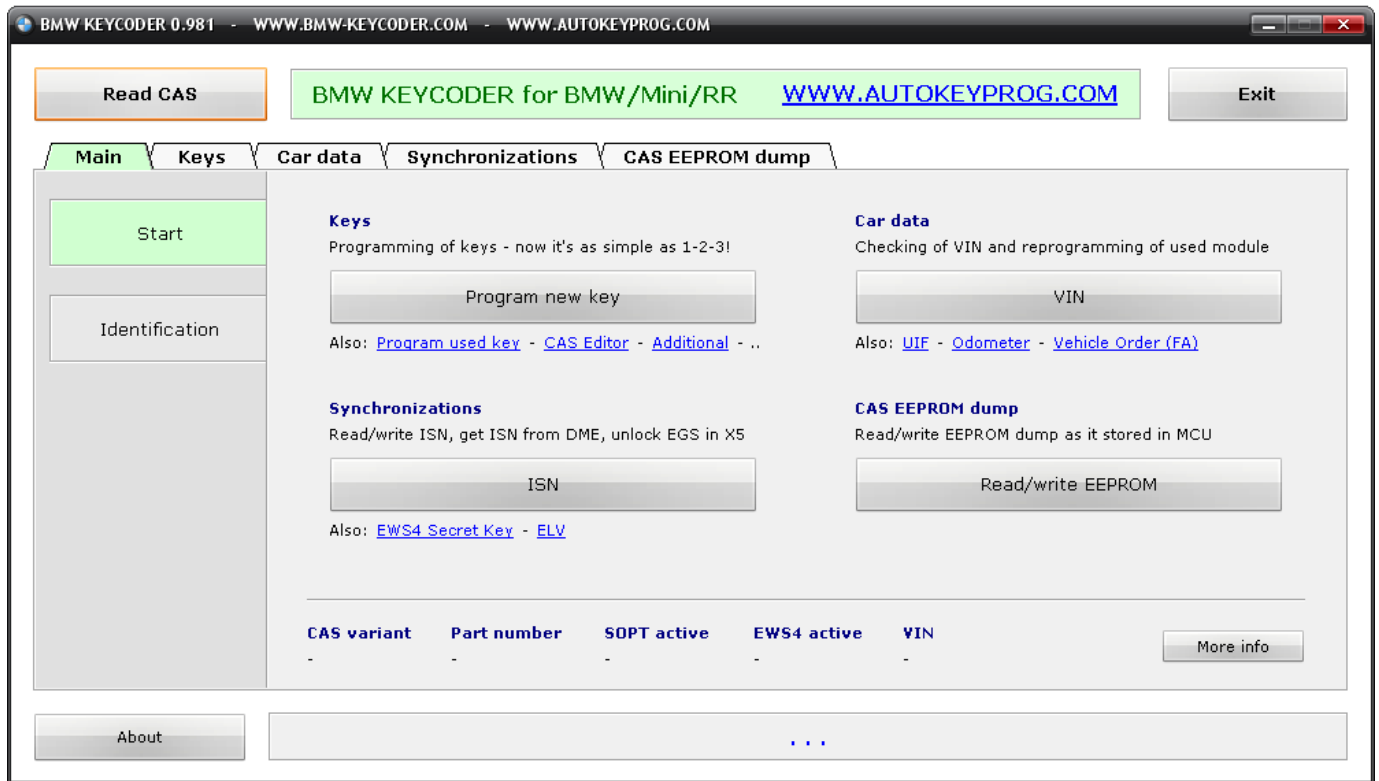
Here you can find guides for various OS. Download the guide for your OS and see the section "Installing CDM Drivers".

USB-dongle drivers will be installed automatically when you insert the dongle into USB-port. It will appear as USB Human Interface Device (HID).

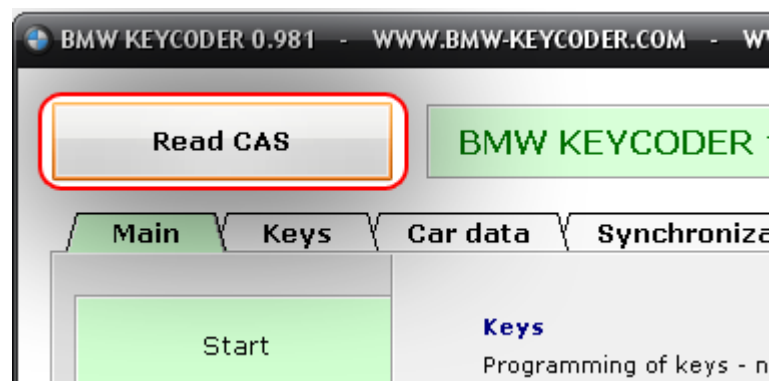
## 3. Using the software

### 3.1. Beginning

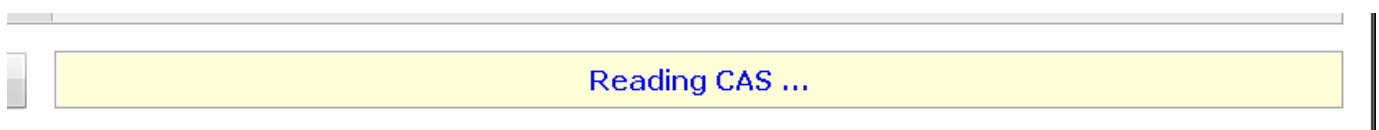
When you start the BMW KeyCoder you will see the start window:



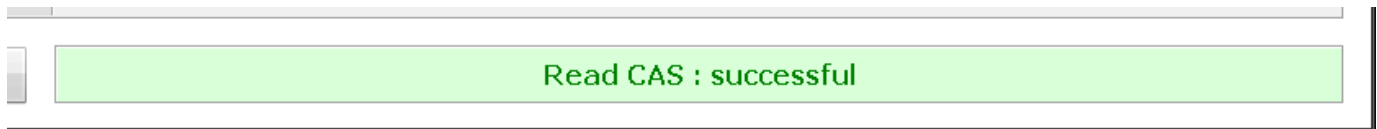
To start work with car press "**Read CAS**" button (don't forget to connect USB-to-ODB-II device and USB-dongle).



All data from CAS will be read (ID, keys, car data and synchronizations). Read operation will take approximately 10-20 seconds. At the bottom of the window you can see the status of the operation.



If all is OK you will see the "green" status at the bottom.

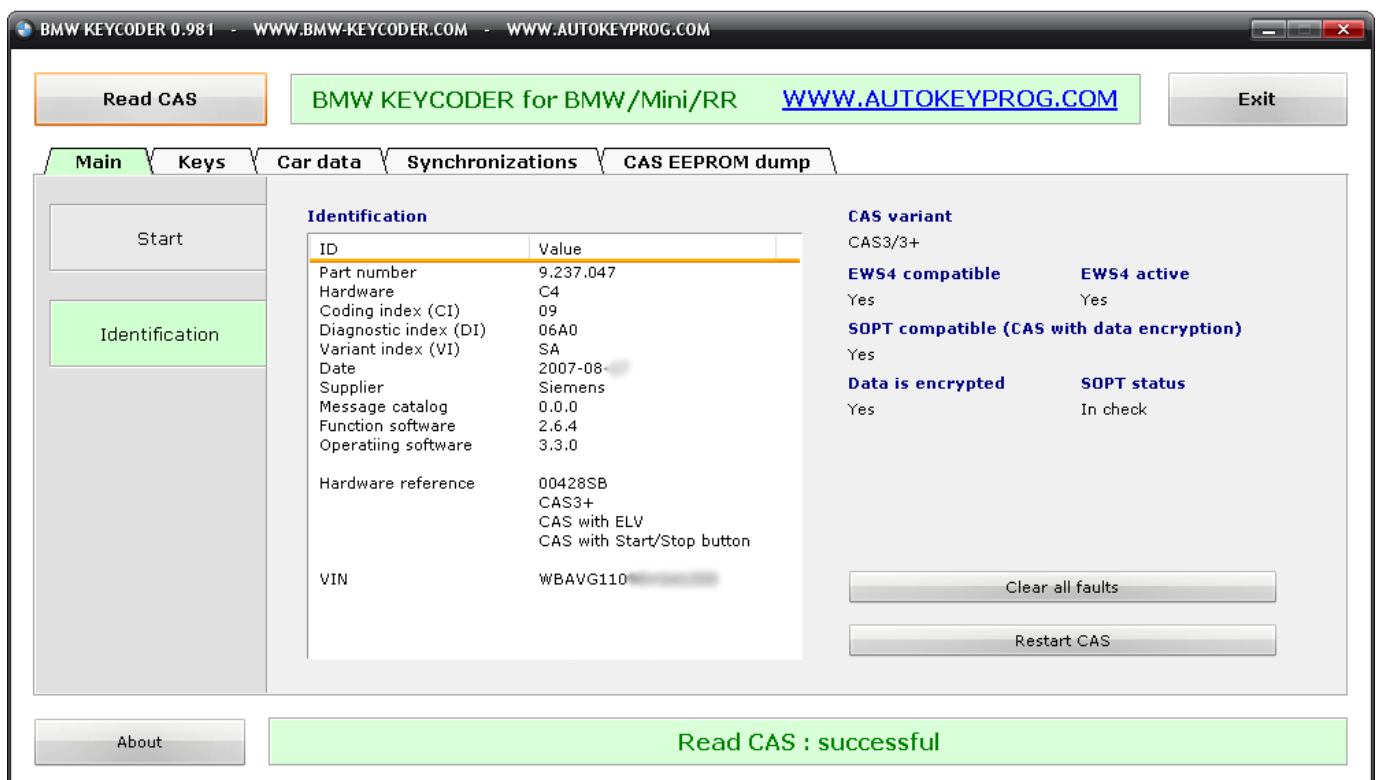


Also at the bottom you can see brief information about CAS and its state.

CAS variant	Part number	SOPT active	EWS4 active	VIN	More info
CAS3/3+	9.237.047	Yes	Yes	WBAVG110	More info

- CAS variant** – generation of CAS module (CAS/ZAS (RD), CAS2 or CAS3/3+);
- Part number** – main number that can "say" version of the firmware inside the CAS;
- SOPT active** – state of the SOPT function. Active state means that keys data, ISN and EWS4 Secret Key are encrypted;
- EWS4 active** – state of EWS4 mode. Active state means that EWS4 Secret Key is used to authenticate CAS and DME/DDE. In inactive state ISN is used;
- VIN** – Vehicle Identification Number.

Button "**More info**" moves you to the window with widened identification data:



Here you can see more identification data. Also from this window you can clear faults memory (DTC's) with "**Clear all faults**" button and restart firmware of the CAS with "**Restart CAS**" button.

### 3.2. Navigation and sections

All functions of the BMW KeyCoder are divided by sections: **"Main"**, **"Keys"**, **"Car data"**, **"Synchronizations"** and **"CAS EEPROM dump"**.

They can be accessed by clicking on the tabs at the top of the window...



... and then selecting subsections in the left menu.



Or you can access functions directly from the start window:

<p><b>Keys</b> Programming of keys - now it's as simple as 1-2-3!</p> <p style="text-align: center;"><input type="button" value="Program new key"/></p> <p>Also: <a href="#">Program used key</a> - <a href="#">CAS Editor</a> - <a href="#">Additional</a> - ..</p>	<p><b>Car data</b> Checking of VIN and reprogramming of used module</p> <p style="text-align: center;"><input type="button" value="VIN"/></p> <p>Also: <a href="#">UIF</a> - <a href="#">Odometer</a> - <a href="#">Vehicle Order (FA)</a></p>
<p><b>Synchronizations</b> Read/write ISN, get ISN from DME, unlock EGS in X5</p> <p style="text-align: center;"><input type="button" value="ISN"/></p> <p>Also: <a href="#">EWS4 Secret Key</a> - <a href="#">ELV</a></p>	<p><b>CAS EEPROM dump</b> Read/write EEPROM dump as it stored in MCU</p> <p style="text-align: center;"><input type="button" value="Read/write EEPROM"/></p>

Click on the button or blue link to open the function's window.



### 3.3. Section "Keys"

In the section "Keys" you can find 5 subsections, each of them allow to perform different functions:

**Program new key** – programming of "empty" transponder, key with remote control or ID-transmitter. Appropriate data will be programmed from CAS into key inserted in the ignition coil.

**Program used key** – programming of used key with known configuration. The data from the key will be programmed into CAS.

**CAS editor** gives you full access to data of all keys programmed in the CAS (*only in PRO version*).

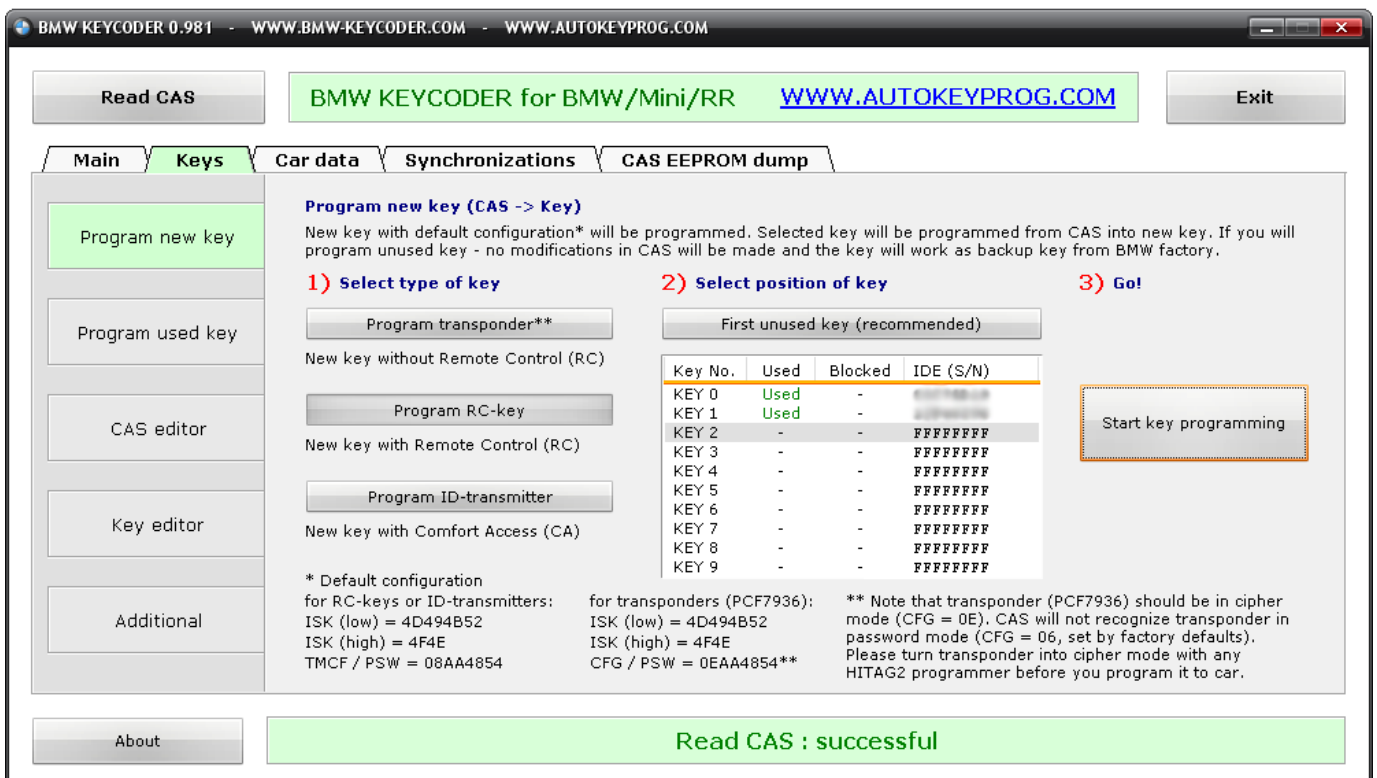
**Key editor** allows you to read and write transponder memory and EEPROM data of the key inserted in the ignition coil (*only in PRO version*).

**Additional** – here you can find several functions: 1) restoration of remote control synchronization value, 2) changing of maximum amount of ID-transmitters in car with Comfort Access, 3) blocking and unblocking of keys, changing "key memory" index.

#### 3.3.1. Programming of new key

Programming of new key is very simple. To program new key you should do only 3 simple steps:

- 1) Select type of key
- 2) Select position of key
- 3) Press "Start key programming" button



The key you want to program should be with default configuration, i.e. ISK low should be equal to 4D494B52, ISK high – 4F4E, PSW – AA4854.

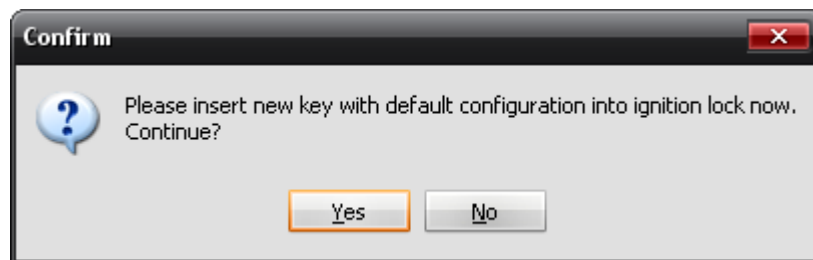
**Important notice!** Transponder's (PCF7936) CFG byte should be equal to 0E, i.e. transponder should be in cipher mode. By default from factory all transponders are supplied with CFG = 06 (password mode). But CAS can't recognize transponder in password mode. So you should turn transponder in cipher mode (CFG = 0E) with any HITAG2 programmer before try to program it to car.

## Step-by-step instructions

Here are exact steps to program new key from the beginning:

- 1) Start the software
- 2) Click "Read CAS" button and wait while car is being read.
- 3) Go to "Keys" - "Program new key" window
- 4) Select type of key
- 5) Select position of key
- 6) Click "Start key programming"

Note that when you click "Start key programming" there must be no key in the ignition coil. You should insert new key only when this prompt appears:



- 7) Insert new transponder, key or ID-transmitter into ignition coil and click "Yes"
- 8) Wait while key is being programmed
- 9) Remove programmed key from ignition coil and insert it again to start the car

If after step 6 you'll see this message you should repeat all sequence from step 2 and insert a working key for this car at step 2

