A·B·R·I·T·E·S
automotive solutions

ABRITES ABPROG PROGRAMMER UPGRADED

User manual
version 1.2

Important notes

The Abrites software and hardware products are developed, designed and manufactured by Abrites Ltd. During the production process we comply to all safety and quality regulations and standards, aiming at highest production quality. The Abrites hardware and software products are designed to build a coherent ecosystem, which effectively solves a wide range of vehicle-related tasks, such as:

Diagnostic scanning;
Key programming;
Module replacement,
ECU programming;
Configuration and coding.

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You, as a purchaser of Abrites hardware products, are entitled of a two-year warranty. If the hardware product you have purchased has been properly connected, and used according to its respective instructions, it should function correctly. In case the product does not function as expected, you are able to claim warranty within the stated terms. Abrites Ltd. is entitled to require evidence of the defect or malfunction, upon which the decision to repair or substitute the product shall be made.

There are certain conditions, upon which the warranty cannot be applied. The warranty shall not apply to damages and defects caused by natural disaster, misuse, improper use, unusual use, negligence, failure to observe the instructions for use issued by Abrites, modifications of the device, repair works performed by unauthorized persons. For example, when the damage of the hardware has occurred due to incompatible electricity supply, mechanical or water damage, as well as fire, flood or thunder storm, the warranty does not apply.

Each warranty claim is inspected individually by our team and the decision is based upon thorough case consideration.

Read the full hardware warranty terms on our website.

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Abrites assumes no responsibility for any damage resulting from the use, misuse, or negligent use of the hardware or any software application.

Safety information

The Abrites products are to be used by trained and experienced users in diagnostics and reprogramming of vehicles and equipment. The user is assumed to have a good understanding of vehicle electronic systems, as well as potential hazards while working around vehicles. There are numerous safety situations that cannot be foreseen, thus we recommend that the user read and follow all safety messages in the available manual, on all equipment they use, including vehicle manuals, as well as internal shop documents and operating procedures.

Some important points:
Block all wheels of the vehicle when testing. Be cautious when working around electricity.
Do not ignore the risk of shock from vehicle and building-level voltages.
Do not smoke, or allow sparks/flame near any part of the vehicle fuel system or batteries.
Always work in an adequately ventilated area, vehicle exhaust fumes should be directed towards the exit of the shop.
Do not use this product where fuel, fuel vapours, or other combustibles could ignite.

In case any technical difficulties occur, please contact the
Abrites Support Team by email at support@abrites.com.

Table of contents

List of revisions

Date	Chapter	Description	Revision
2021	ALL	Document Created	1.0
18.08.2023	ALL	Revision, ZN086 added	1.1
02.08.2023	ALL	General Revision; ZN046, ZN058, ZN078, ZN086 added	1.2

1. Introduction

The ZN030 ABPROG Programmer is a set of devices, designed to assist with many procedures, which require work on bench with multiple units in the vehicle.

Main functionalities:

- Read, write and erase SPI, Microwire and I2C memories
- Read, write and erase memory of the FEM/BDC without removing it
- Read and write Bosch EDC16 units (MPC)
- Reading, writing, and erasing of NEC MCUs from Mercedes-Benz IR-keys
- Renew HITAG 2 type keys
- Reading and writing NEC V850 in different modules
- Reading EWS masks

ABProg should be used with ABRITES software produced by Abrites Ltd.

ABRITES is a trade mark of Abrites Ltd.

2. Getting Started

2.1 System requirements

Minimum system requirements – Windows 7, SP1 with 512 MB RAM
USB port with supply 100 mA / 5V +/- 5%

2.2 Supported devices

SPI EEPROM
ST M35080VP / ST M35080V6
ST D080D0WQ
ST D160D0WQ
ST M95010
ST M95020
ST M95040
ST M95080
ST M95160
ST M95320
ST M95640
ST M95128
ST M95256
ST M95P08

I2C EEPROM
24C01
24C02
24C08
24C16
24C32
24C64
24C128
24C256
24C512
24C1024

MW EEPROM
93C46 8bit / 16bit
93C56 8bit / 16 bit
93C66 8bit / 16 bit
93C76 8bit / 16 bit
93C86 8bit / 16 bit

MPC
MPC555/556 Flash
MPC555/556 CMF A/B Shadow Rows
MPC533/534/564 CMF Flash
MPC533/534/564 Shadow Row
MPC535/536/565/566 CMF Flash
MPC535/536/565/566 CMF A/B Shadow Rows
MPC5XX External Flash (58BW016XX, AMDXX, Intel28XX, Micron 58BW016XX, Numonyx 58BW016XX, Spansion 29CXX, ST 58BW016XX)
MPC5XX External EEPROM (ST 95640, ST 95320, ST 95160, ST 95080)

Renesas V850 MCU
UPD70FXXXX PFlash
UPC70F35XX DFlash
DFlash 32KB V850ES
Renault BCM (X95)
Renault HandsFree (X98)

PCF
AUDI 8T0959754XX, 4G0959754XX, 4H0959754XX 315 / 868 / 433 MHz
BMW F HUF5XXX, 5WK496XX 868 / 315 / 433 MHz
BMW E 5WK49XXX Remote / Keyless 868 / 315 / 433 MHz
PORSCHE 7PP969753XX 433 / 434 / 315 MHz
VOLVO 5WK4926X 433 / 900 MHz
RENAULT AES, AES KEYLESS, DACIA AES, FLUENCE, MEGANE 3
OPEL ASTRA H, ZAFIRA B, ASTRA J/INSIGNIA
RANGE ROVER 5E0U40247 434MHz
MITSUBISHI G8D 644M
PSA 21676652, E33CI002, E33CI009, E33CI01B
CHRYSLER JEEP DODGE KOBOTO04A
BUICK 13500224(13584825),13500225(13584825) 315MHz
CHEVROLET 135XXXXX
GM KEYLESS 433MHz 5BTN
CADILLAC NBG009768T 315MHZ 5BTN KEYLESS

MB NEC KEY
EWS
0D46J
2D47J
MC9S12XEx - read/write MCU EEPROM, PFlash, DFlash

2.3 Software installation steps

Please start the executable file above to initiate installation procedure and follow the on screen instructions.

Depending of your operation system and settings you can be asked to confirm starting of installation procedure.
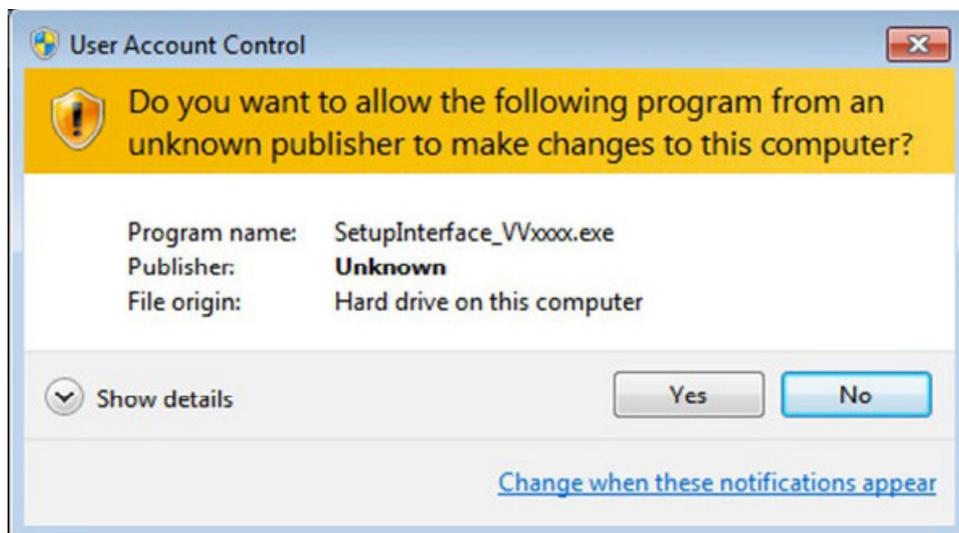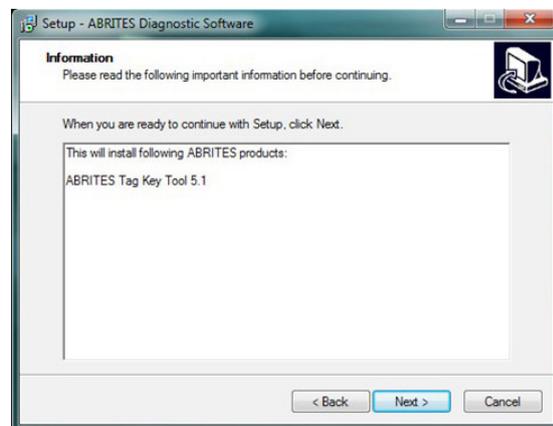
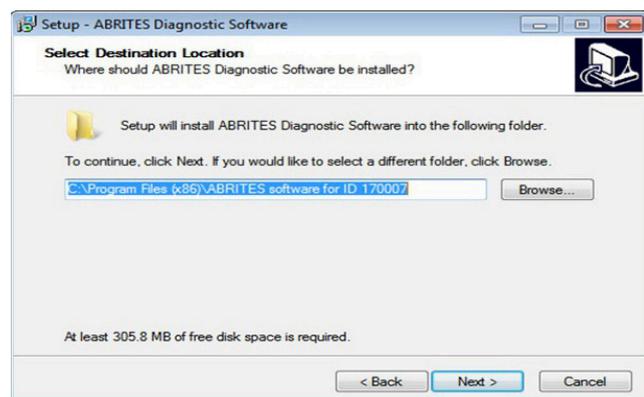Press "Next" button to proceed with the installation.

Read carefully license agreement and select "I accept the agreement" if you accepting all. Then press "Next" button.
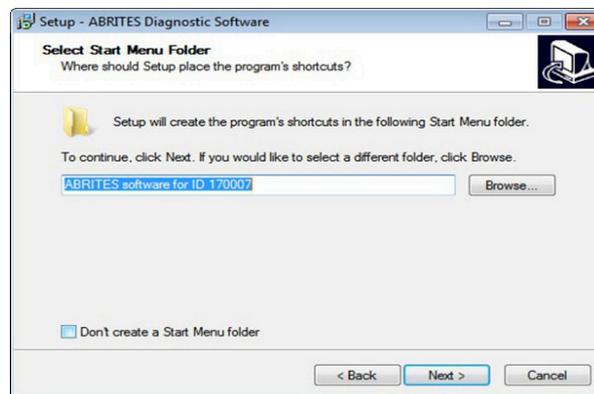If you not agree press cancel to interrupt installation procedure.

Press "Next" button to proceed with the installation.

Press "Next" button to proceed with the installation.

Press "Next" button to proceed.

If you don't want desktop icons unchecked the check box about creation of icons. Press "Next" button to proceed.
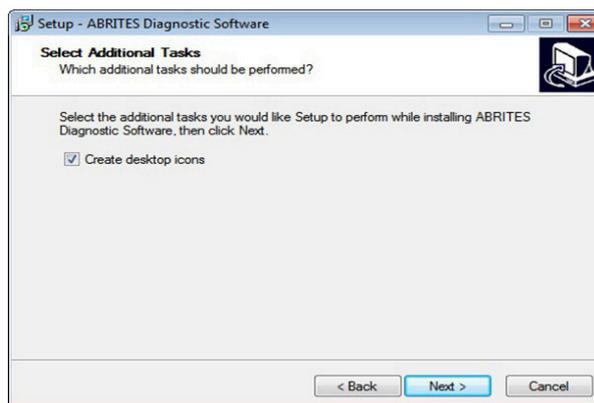
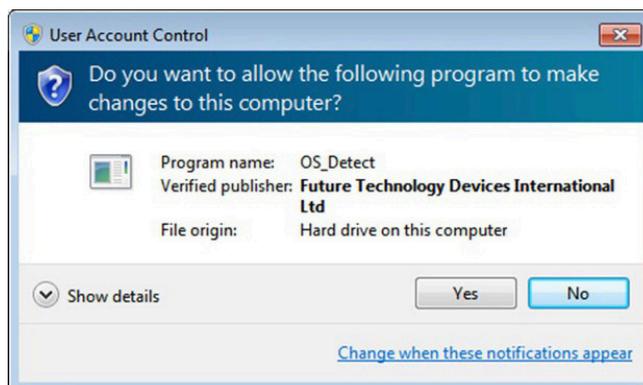Press "Install" and wait until installation complete.
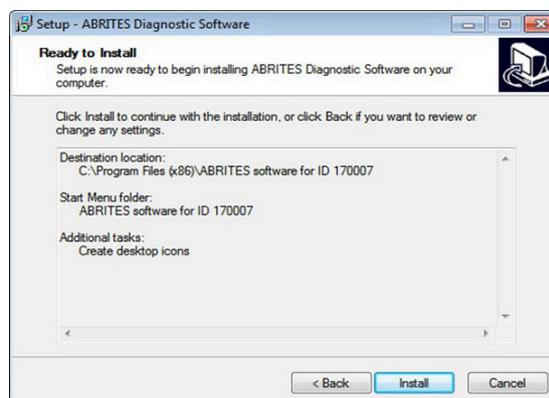
Be sure that check box about installation of interface's USB drivers is set especially if you installing for first time Abrites Diagnostic Software.
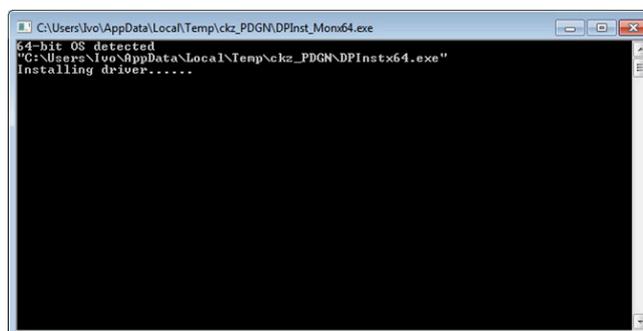
Press "Finish".

Depending setting of your operation system you can be asked to confirm installation of USB drivers.

Press "Yes".

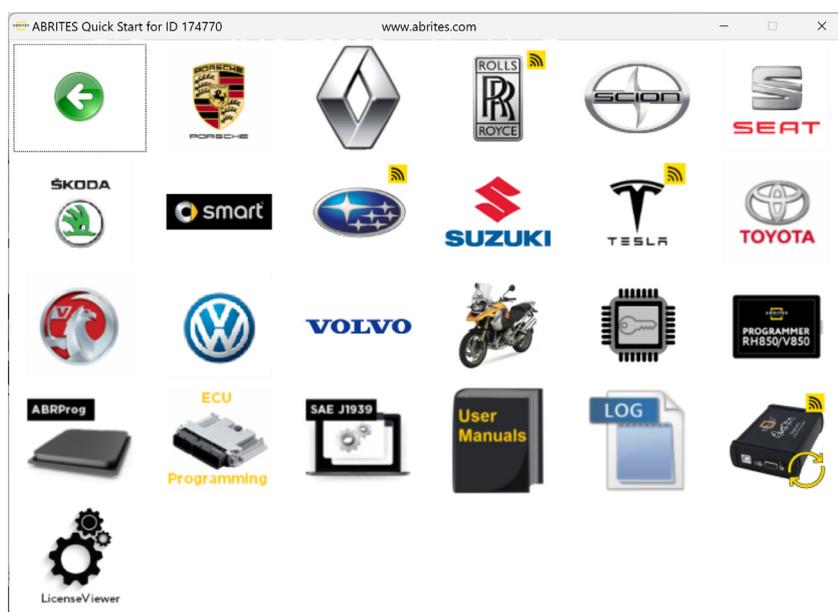Wait until installation of USB driver finish.

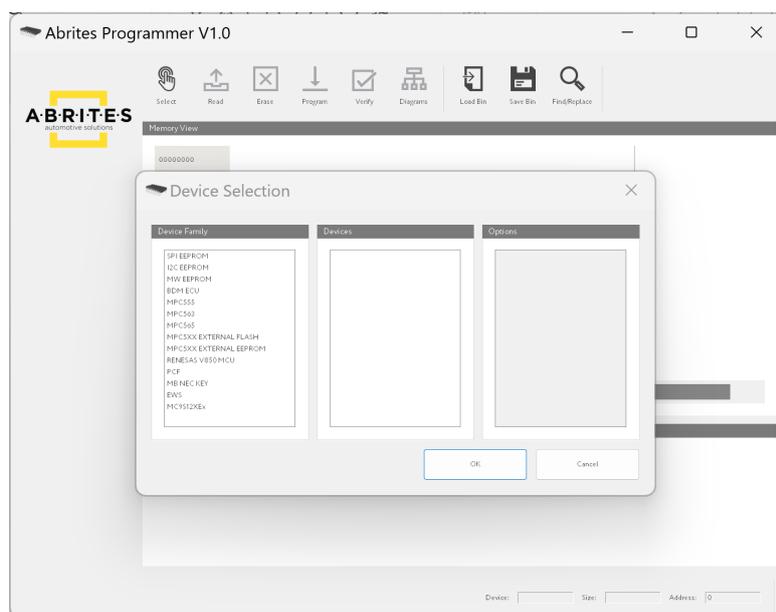## 2.4 Connection of the programmer to the interface
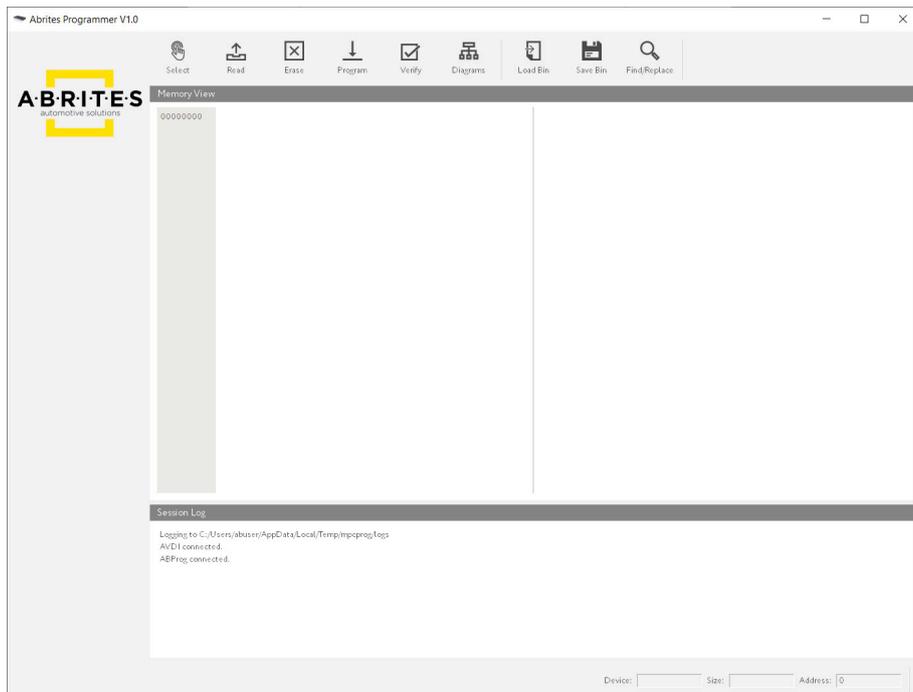

2.5 Starting of the software

When programmer is ready and connected to the interface you can start the software.
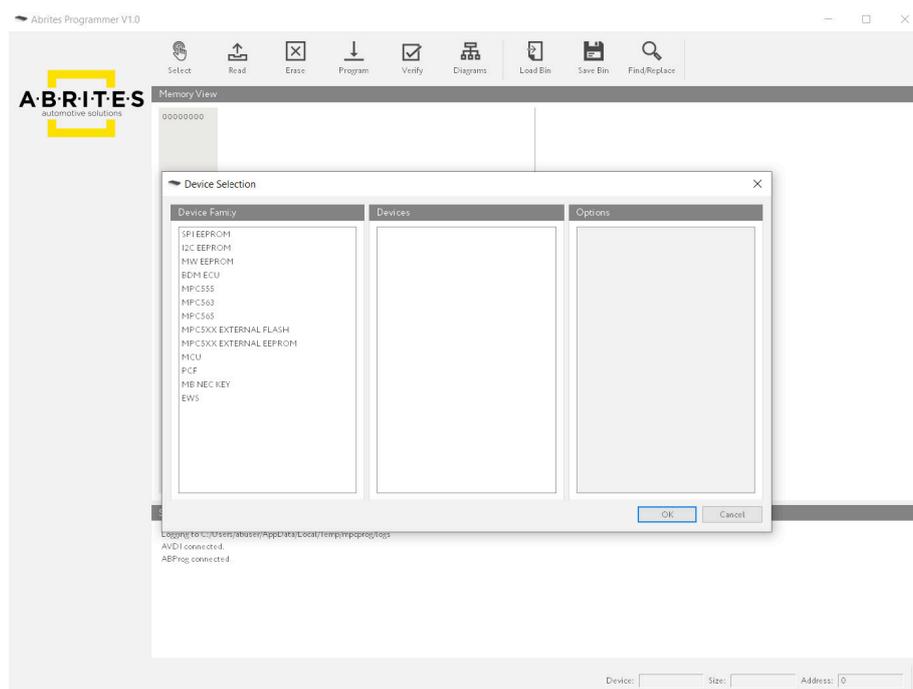
When the programmer (ZN045) is connected to the AVDI you can start the software by selecting ABProg > Upgraded:

This is the main screen of the software:

The "Select" option will open the list with all supported devices:

The **"Read"** option will read the memory of the selected device.

The **"Erase"** option will erase the memory of the selected device.

The **"Program"** option will program the selected device using the data from the hex editor.

The **"Verify"** option will compare the memory of the selected device with the contents of the hex editor.

The **"Diagrams"** option will show a wiring connection diagram(if available) for the selected device.

The **"Load"** option allows the user to load a binary file in the hex editor.

The **"Save"** option allows the user to save to contents of the hex editor to a binary file.

The **"Find/Replace"** option will search for hex/UTF-8 pattern in the contents of the hex editor.

3. Hardware

3.1 ZN030 - ABPROG set

The ZN030 ABProg set contains the following:

- CB101 extension cable
- ZN031 Abprog eeprom BCM - for reading, writing and erasing of SPI, Microwire and I2C memories.
- ZN033 NEC MCU adapter - for reading, writing and erasing of NEC MCUs from Mercedes-Benz IR-keys.
- ZN035 Abprog eeprom socket - solution used when reading and writing 8-pin eeprom memories.
- ZN045 Abprog programmer
- DB25 Male connector

There are additional tools that are used with the ABProg programmer, which are sold separately and are described in this user manual.
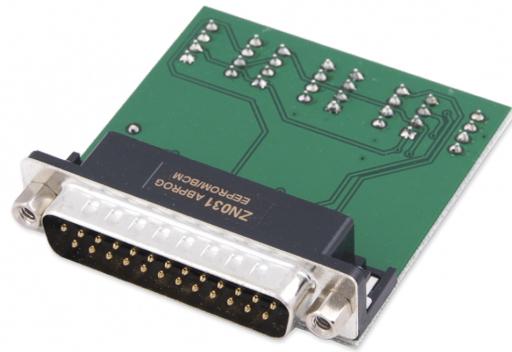
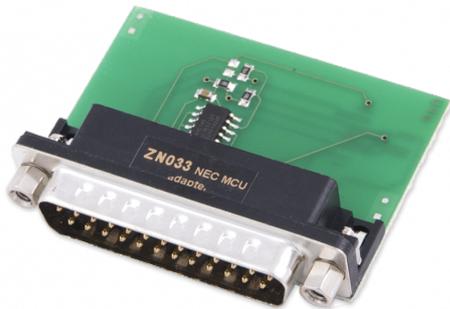**ZN030 set includes:**

ZN045 Abprog programmer

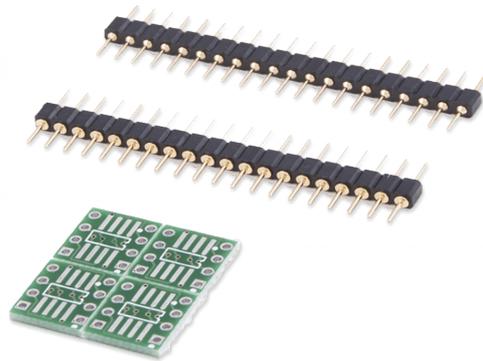
ZN031 - ABPROG EEPROM/BCM adapter

ZN033 – ABPROG NEC adapter

ZN035 - ABPROG eeprom socket

CB101 extension cable

DB25 Male Connector

3.2 Additional cables and adapters for ABProg programmer
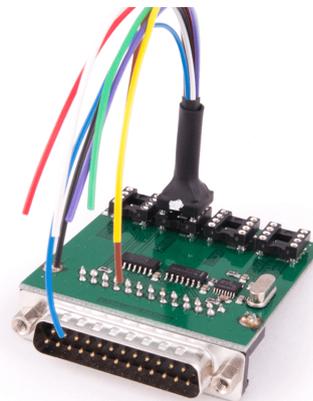
ZN032 – ABPROG NEC adapter with socket

ZN046 - Key Renewal Adapter

ZN055 - ABPROG EW S3 adapter

ZN057 - EEPROM wire extender for ABPROG EEPROM/BCM adapter

ZN058 - V850E2 adapter for ABPROG

ZN073 - BDM Programmer

ZN078 - V850ES ADAPTER for ABPROG
ABProg Upgraded software

ZN086 MC9S12 ADAPTER for ABPROG
ABProg Upgraded software

4. ZN046 Key PCB Renewal Adapter

The ZN046 is an adapter for renewing used keys in order for them to be programmed to another vehicle. It is an invaluable tool for all locksmiths, used with the ABPROG programmer.

Supported keys:
All types of keys with a PCF processor
(full supported list in the Compatibility tab, pinout available in the Technical specifications tab)

During the key renewal procedure, the adapter is soldered onto the PCB of the key and connected to the ABPROG programmer.

Note: This ABPROG function will allow you to use any HITAG Key with any vehicle that uses HITAG as long as the keys are from the same HITAG Generation.

Description of the applicable cable colors used for soldering	
RED	+ BAT
BLACK	- GND
GREEN	DATA
WHITE	CLK (clock)

After the soldering, the DB-25 male side of the add-on needs to be connected to the DB-25 female connector of the ABPROG ZN045.
After which, the male DB-15 part of the ZN045 needs to be connected to the female DB-15 connector on the AVDI.

The following photos will show you how the connection points on the key PCBs look like, so that you can proceed with the soldering.

All Porsche Hitag type of keys (new Porsche Keys) have the following soldering points:

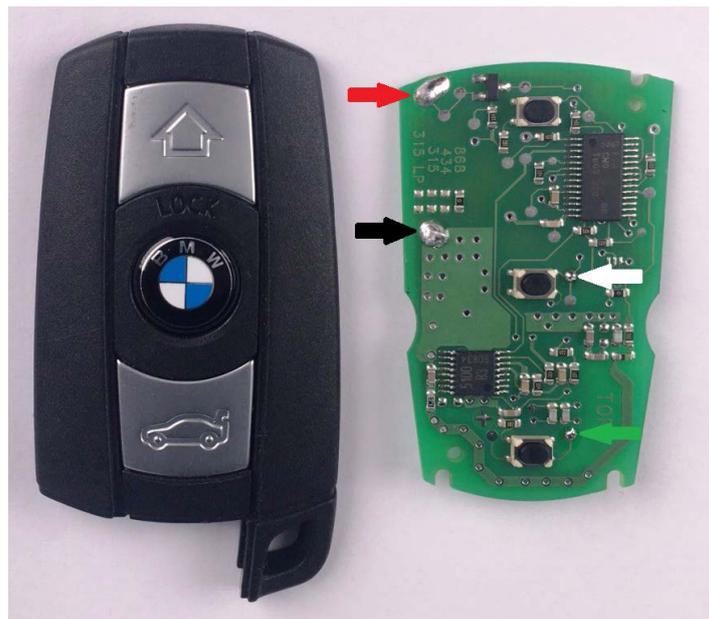Audi BCM2 keys have the following soldering points

BMW F-Series 1st type Keys have the following soldering points:

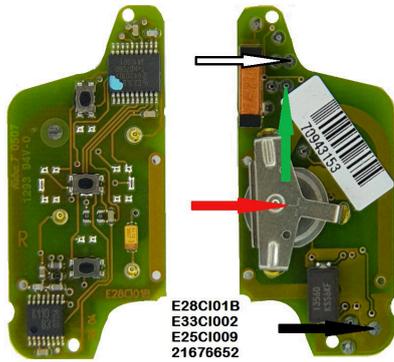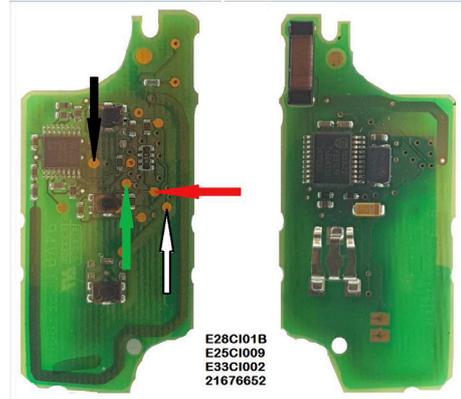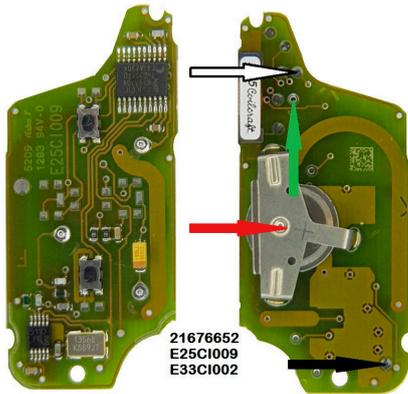BMW F-Series 2nd type Keys have the following soldering points:

BMW E-Series Keys have the following soldering points

Volvo Keys have the following soldering points:

PSA keys have the following soldering points:

21676652
E25CI009
E33CI002

E28CI01B
E25CI009
E33CI002
21676652

E28CI01B
E33CI002
E25CI009
21676652

The last added keys for renew are the following:

*AUDI 8T0959754 433MHz R 233.453.111 02
*AUDI 8T0959754A 315MHz R 233.453.111 02
*AUDI 8T0959754F 433MHz K 233.453.111 02
*AUDI 8T0959754F 433MHz K 233.453.111 05-06
*AUDI 8T0959754F 433MHz K 233.453.111 05-06
*AUDI 4G0959754G 315MHz K 233.453.111 05-06
*AUDI 4H0959754G 315MHz K 233.453.111 05-06
*AUDI 4H0959754K 868MHz K 233.453.111 05-06
*AUDI 8T0959754 433MHz R 233.453.111 05-06
*AUDI 8T0959754D 868MHz R 233.453.111 05-06
*AUDI 8T0959754G 315MHz K 233.453.111 05-06
*AUDI 4G0959754BP 315MHz K 233.453.211 01-02
*AUDI 4G0959754DB 315MHz K 233.453.211 01-02
*AUDI 4G0959754DC 315MHz K 233.453.211 01-02
*AUDI 4H0959754DA 433MHz K 233.453.211 01-02
*AUDI 4H0959754DB 315MHz K 233.453.211 01-02
*AUDI 8K0959754BR 868MHz K 233.453.211 01-02
*AUDI 8K0959754D 868MHz K 233.453.211 01-02
*BMW F HUF5662 315MHz
*BMW F HUF5663 433MHz
*BMW F HUF5767 433Mhz
*BMW F 5WK49662 433MHz
*BMW F 5WK49663 315MHz
*BMW E 5WK49127 315MHz REMOTE
*BMW E 5WK49145 868MHz KEYLESS
*BMW E 5WK49147 315MHz KEYLESS
*PORSCHE 7PP959753BN 434MHz
*PORSCHE 7PP959753BQ 315MHz
*PORSCHE 7PP959753BM 315MHz
*PORSCHE 7PP959753BS 434MHz
*VOLVO 5WK49266 900MHz
*RANGE ROVER 5E0U40247 434MHz
*MITSUBISHI G8D 644M
*PSA 21676652
*PSA E33CI002
*PSA E25CI009
*PSA E28CI01B

*CHR JEEP DODGE KOBOTO4A
*BUICK 13500224(13584825) 315MHz
*BUICK 13500225(13584825) 315MHz
*OPEL ASTRAJ/INSIGNIA 13500234 433MHz 3BTN
*CHEVROLET 13500319(13584829) 315MHz 5BTN
*CHEVROLET 13575163 433MHz 2BTN
*CHEVROLET 13575175 433MHz 3BTN
*CHEVROLET 13500221 315MHz
*GM KEYLESS 433MHz 5BTN
*CADILLAC NBG009768T 315MHz 5BTN KEYLESS

Note: If a wiring diagram is missing in the software, please send an email to support@abrites.com together with your AVDI ID and a picture of the key you want to renew with its product version.

The following photos will show you how a soldered PCB looks like. The Example is of a BMW F-Series
HUF Key PCB:
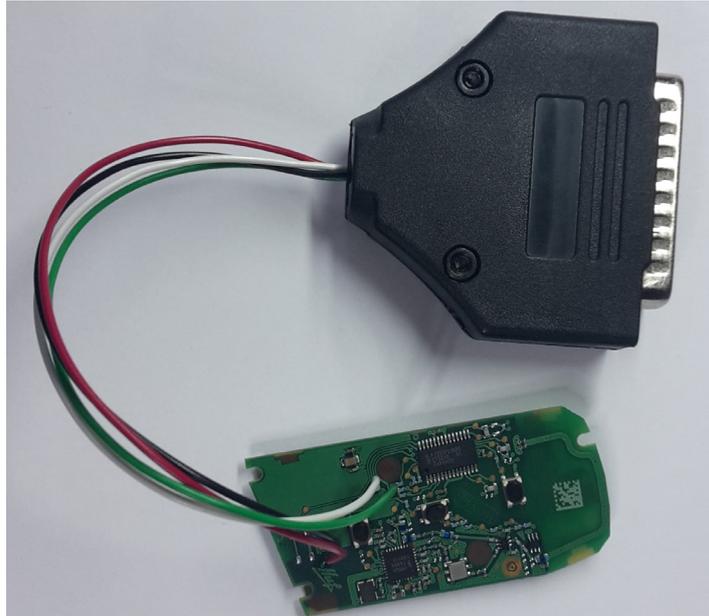
You can connect the adapter to the ABPROG adapter to AVDI as shown in the picture below:
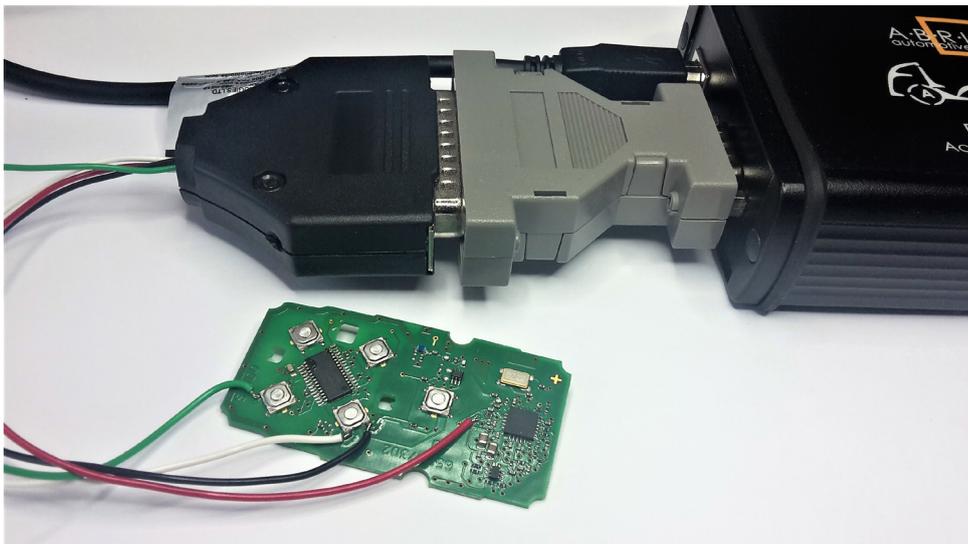
Once the cables of the ABPROG Adapter are soldered to the PCB, the ABPROG software can be started.

Select the "PCF" Option from the "Select" menu and the PCB model you are about to renew. After the desired options are selected, you can click on "Program" to renew the key and make it virgin. Click on "Yes" to confirm the renewal process.

Once the procedure is completed, you will see the "KEY Write finished successfully message". This means that the key is now renewed and made virgin. You can continue with programming the key to another car.
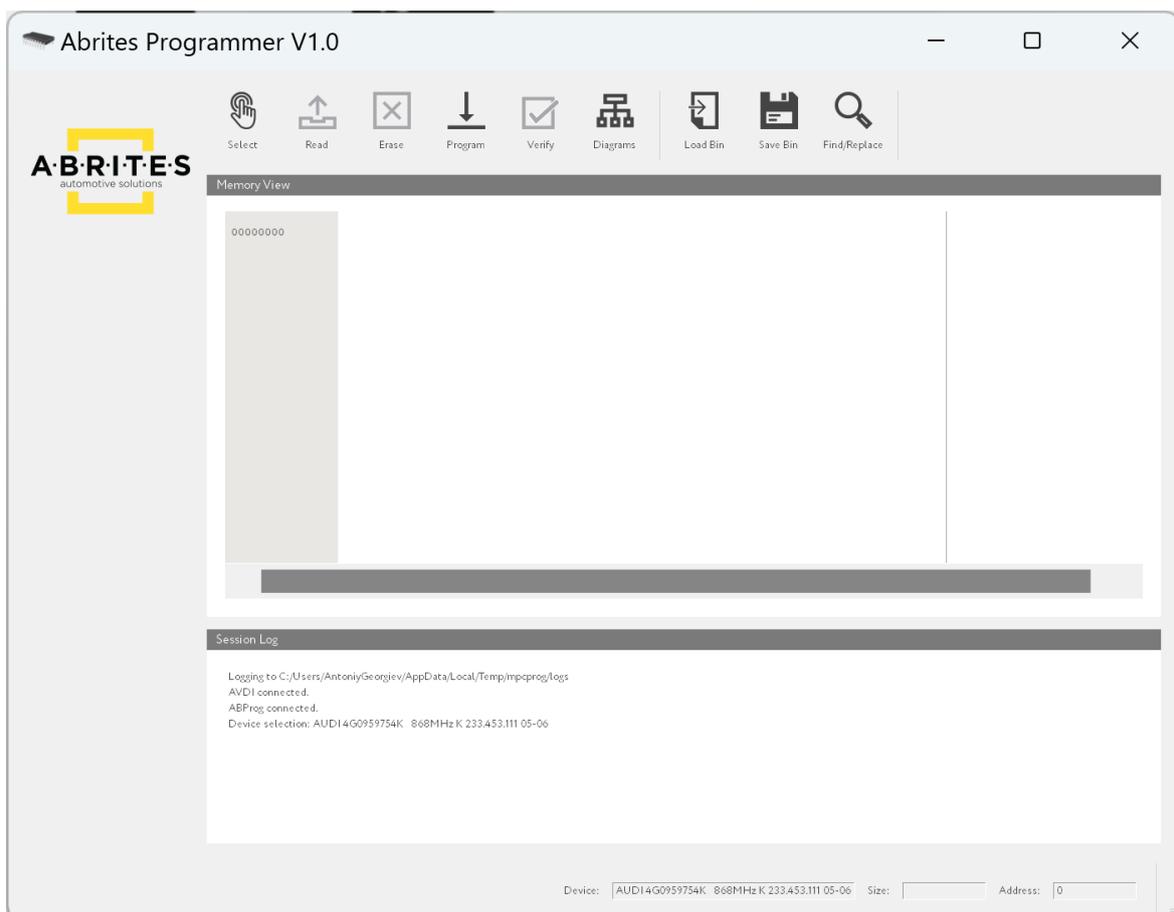
5. ZN055 - ABProg EWS3 Adapter

The Abrites ABPROG EWS3 Reader (ZN055 - ABPROG EWS3 adapter) allows you to read the EWS3 Dump from the EWS3 cars in order to program a key, and it is very useful when working on the BMW models. Supported vehicles:
BMW E46/E53/E85/E83/E39/E38/E52 (equipped with a EWS3 module)

The tool attaches to the ABPROG programmer which attaches to the AVDI interface in order to read the EWS3 dump.

Once you have read the EWS3's dump, you will be able to save it on your computer. Then you will be able to load this dump in the PROTAG software and program a key using it. With the help of the EWS3 Adapter you will no longer need to use third party EWS3 Programmers to read the EWS dump.
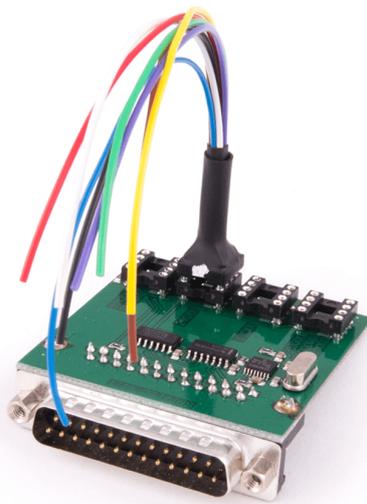
ZN055 - ABPROG EWS3 adapter
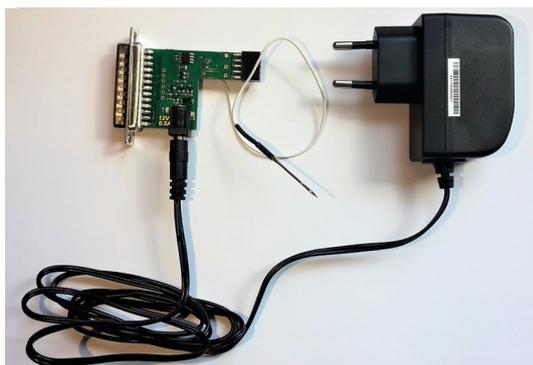
Connection diagram and Boot Pin on EWS
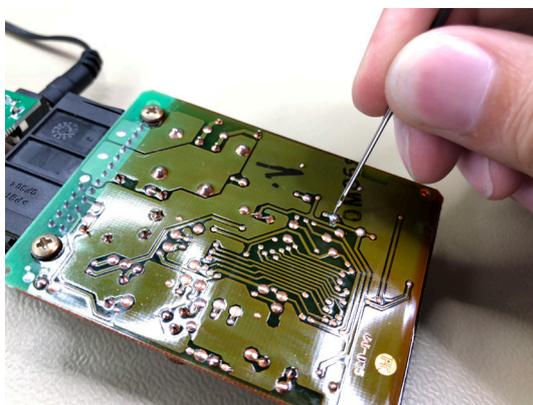
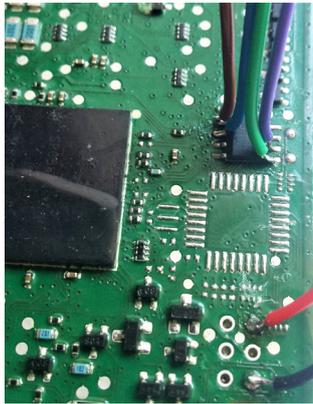# 6. ZN057 EEPROM Adapter

This is a wire extender for the ZN031 - ABPROG EEPROM/BCM adapter, used to read chips without removing them from the PCB in tasks such as reading the EEPROM of the FEM/BDC module in BMW F-series vehicles.

The photo below shows how to connect to a BMW BDC and a FEM unit to read the EEPROM:

The photo below shows how to connect to a BMW BDC and a FEM unit to read the EEPROM:
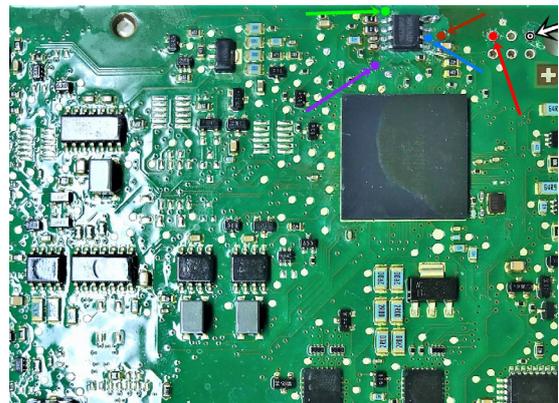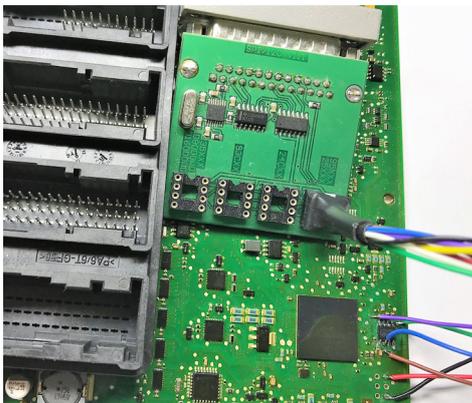
7. ZN058 - V850E2 adapter for ABPROG

This adapter is used to read V850E2 single-wire (RX+TX) micro controllers using the ABPROG programmer. The adapter is connected to the ABprog and the wires are soldered to specific points.

This adapter is exclusively used with the ZN030 ABPROG programmer and is not a standalone product.
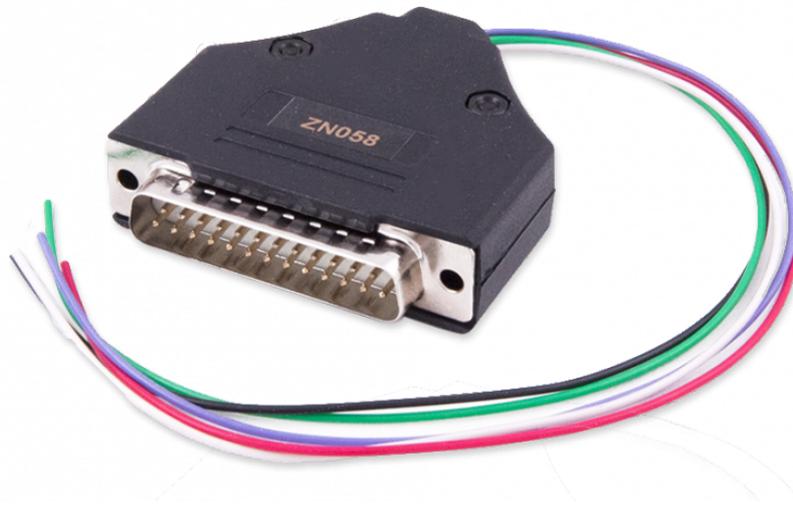
8. ZN078 - V850ES ADAPTER for ABPROG

The newly developed ABPROG-compatible adapter, replacing the ZN034

The ZN078 adapter is the updated version of the ZN034 flat cable, developed and designed by Abrites. It is used in procedures like reading and writing processors which require communication via separate RX/ TX lines.

Main functionalities:
- **Reading, erasing and writing unlocked V850ES MCUs**
- **Reading and writing all other modules where a direct connection to the PCB is required**

The adapter is used with the Abrites ABPROG programmer (ZN030).

9. ZN073 - BDM ECU Programmer

This function is intended for BDM reading of EDC16XX/MED9.XX ECU memory. In order to read the ECU memory in BDM you will need ZN045 ABPROG programmer, ZN073 BDM adapter and an external power supply for working on bench.

> Warning: Please adhere to the provided sequence of operations. Failure to do so may lead to unintended consequences, the least of which is a bricked ECU.
> Note: The BDM Programmer requires the ECU to be removed from the vehicle, as the programming needs to take place on a workbench.
> Tools needed: 12/24V power supply, soldering iron, double-row 1.27mm pitch PCB headers

Please ensure you follow the steps below when connecting or disconnecting the ECU:
1. Ensure both AVDI and the ECU are powered off.
2. Remove ECU from vehicle and open it on workbench.
3. Solder 14-pin header on BDM test points, as indicated in example picture (picture coming soon)
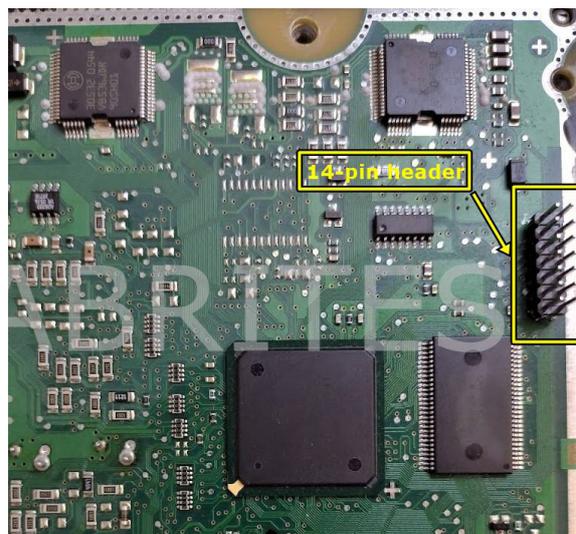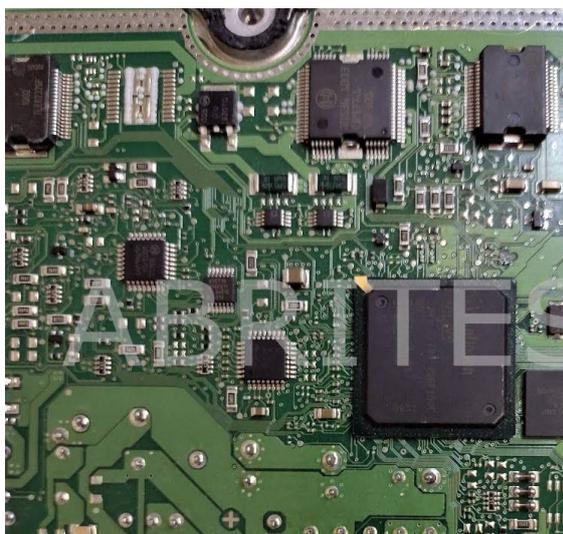
4. Connect the BDM adapter to the ECU using a ribbon cable. Warning: incorrect wiring may cause permanent damage to the adapter and/or the ECU.

5. Connect the BDM adapter(ZN073) to ABProg(ZN045).

6. Connect the ABProg(ZN045) to AVDI.

7. Connect AVDI to PC.

8. Power on AVDI.

Ensure orange LED on BDM adapter is ON

9. Power ON the ECU – it should immediately enter Debug mode

*This is achieved by connecting the ECU to an external 12V power source using the ECU's connector, specifically its B+ and GND pins, with options like ZN051 and ZN074 for power supply. Ensure green LED on BDM adapter is ON

10. Launch the Abrites programming software

11. Select the desired ECU memory from the software menu

12. Select desired operation (read/erase/program). Note: If you want to program the ECU, the selected memory must first be erased

13. When finished, exit the user application

14. Power off the ECU

15. Power off AVDI and disconnect BDM adapter from target ECU

IMPORTANT NOTE: Do not write anything in the first 8 bytes of the MPC processor shadow rows, unless you are completely certain in what you do. The shadow rows contain censoring information, and fiddling with it may lead to locking out the processor without possibility for unlocking.

ABPROG to BDM ADAPTER PINOUT

Connector A - Standard BDM (10 Pins)	
Pin 1	VFLS 0
Pin 2	Not Connected
Pin 3	GND
Pin 4	DSCK
Pin 5	GND
Pin 6	VFLS 1
Pin 7	HRESET
Pin 8	DSDI
Pin 9	VCC
Pin 10	DSDO

Connector B - BOSCH EDC BDM (14 Pins)	
Pin 1	HRESET
Pin 2	Not Connected
Pin 3	DSCK
Pin 4	DSDI
Pin 5	Not Connected
Pin 6	VCC
Pin 7	Not Connected
Pin 8	Not Connected
Pin 9	VFLS 1
Pin 10	VFLS 0
Pin 11	DSDO
Pin 12	GND
Pin 13	Not Connected
Pin 14	Not Connected

10. ZN086 - MC9S12 ADAPTER for ABPROG

Using the ZN086 you can read unlocked MC9S12's from the xExxx series - PFlash, DFlash and EEPROM data, save them, and later write to another module. The whole procedure takes minutes and allows you to adapt these modules in the vehicle (clone the donor module onto the new/used one).

Important: The PIN that needs lifting, is specific for each processor, and you need to find that information first. Since there are many variations, you will need to do your own research and get to the processor's data sheet. The PIN that needs lifting is the "RST" or reset PIN.

The ZN086 adapter is soldered onto four points on the PCB (one of which is the lifted pin) and then connected to the ABPROG > the ABPROG is connected to AVDI, and AVDI to your laptop.

You can either use the Upgraded or Classic version of the software.

First, you need to read PFlash and EEPROM, save them, and then program them on the replacement module's PCB.

MC9S12 processor is used in a variety of modules, such as DSM and ISM in FBS4 Mercedes-Benz vehicles, etc.
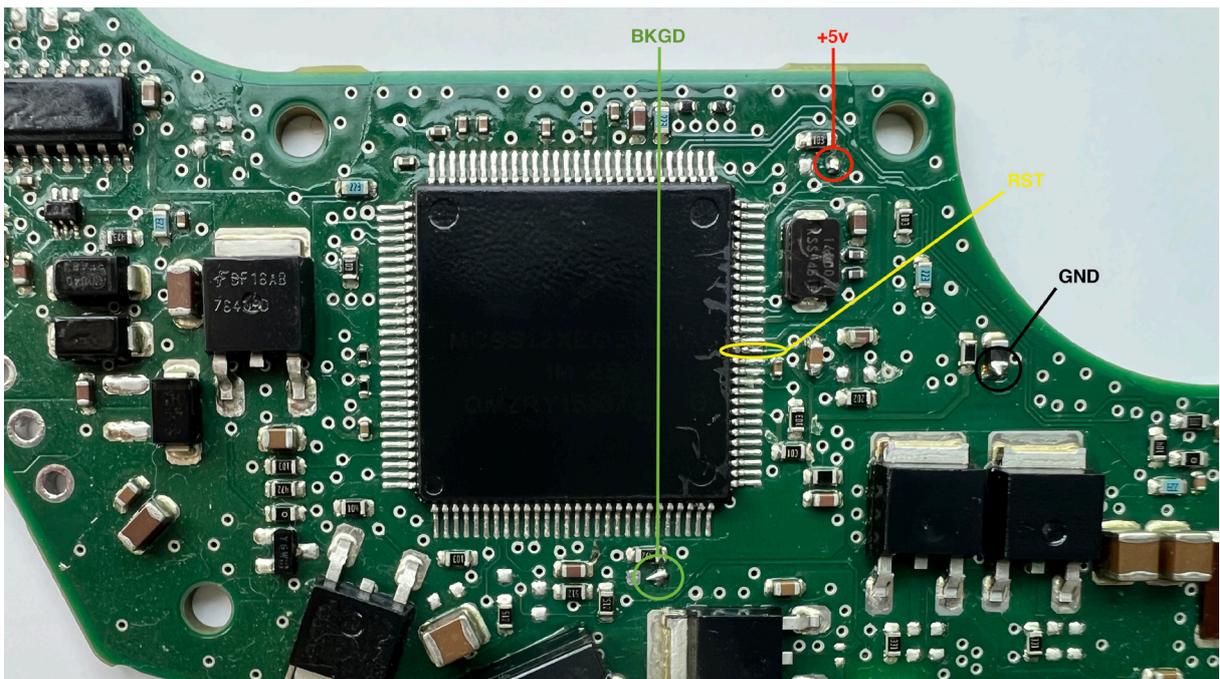
Below you may find a picture of the adapter, and where the option in the software is located - from the main screen you need to click "select" and find the options.
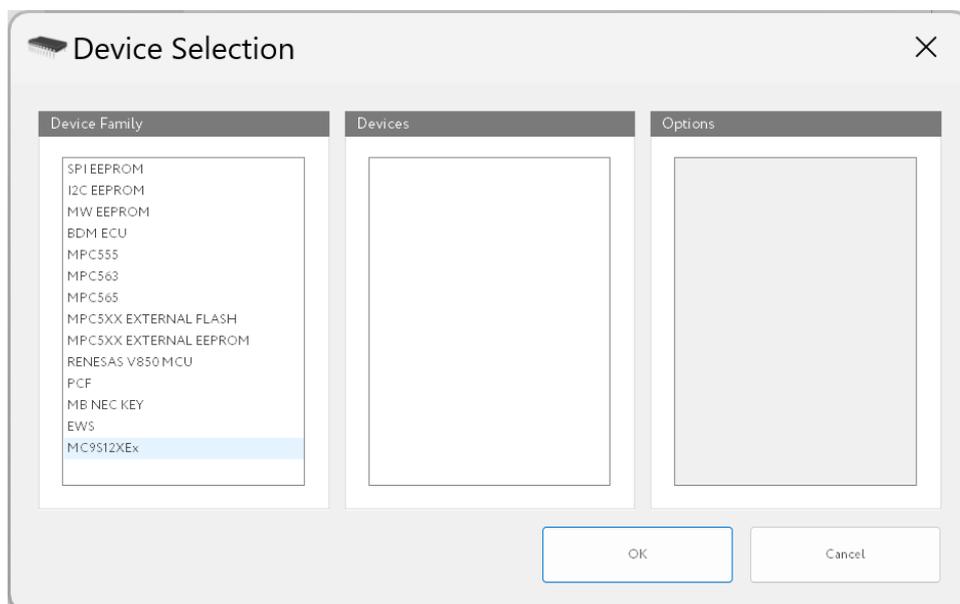
ZN086 MC9S12 ADAPTER for ABPROG

PIN 14 - GND - Black
PIN 21 - +5v - Red
PIN 11 - RST - Yellow
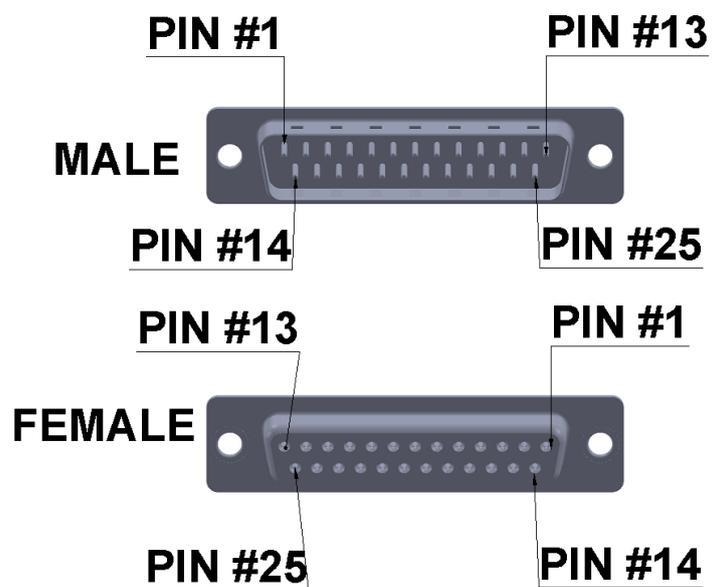PIN 19 - BKGD - Green

For more details on how the ZN086 is used, please check the following video

11. DB25 Male Connector

This connector is used if you do not own a particular adapter used with the ABProg, thus, you will be able to make your own adapter as per the task required.

Here is how to use the DB25 adapter as some of the additional adapters intended to work with ABProg programmer:

- ZN046 PIN OUT:

PIN 1 - - Red wire
PIN 2 - - Red wire
PIN 3 - - Red wire
PIN 4 - - Red wire
PIN 5 - RX - Green Wire
PIN 6 - TX* - White wire
PIN 14 - GND - Black wire
38K resistor between PIN 6 and PIN 14

- ZN058 PIN OUT

PIN 5 - RX* - Purple* wire
PIN 6 - TX* - Purple* wire
PIN 13 - FLMD0 - White wire
PIN 14 - GND - Black wire
PIN 20 - +5V* - Red wire
PIN 25 - Reset - Green wire
10K resistor between PIN 5 and PIN 20
1N4148 led between PIN 5 and PIN 6

- ZN078 PIN OUT:

PIN 5 - RX* - Purple* wire
PIN 6 - TX* - Blue wire
PIN 13 - FLMD0 - White wire
PIN 14 - GND - Black wire
PIN 20 - +5V* - Red wire
PIN 25 - Reset - Green wire

- ZN086 MC9S12 ADAPTER for ABPROG

PIN 14 - GND - Black
PIN 21 - +5v - Red
PIN 11 - RST - Yellow
PIN 19 - BKGD - Green