A·B·R·I·T·E·S
automotive solutions

ABRITES DIAGNOSTICS FOR TOYOTA/LEXUS/SCION



User manual
version 2.8

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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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.

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APPENDIX

List of revisions

Date	Chapter	Description	Revision
27.08.2010	ALL	First version of the document.	1.0
01.10.2015		Update/ Universal 4c key description added, procedures for smart keys	2.1
07.03.2016	5	Using the ZN039-2 hardware to perform key learning	2.2
04.03.2020	5	Revision of the document + Toyota H immobox key learning procedures	2.3
10.10.2020	5	Additional information regarding the usage of ZN067 cable	2.4
11.03.2021	9	ID-Box reset including 2018+ vehicles	2.5
11.03.2021	10	Smart system replacement for 2017+ vehicles (DST AES/ HITAG AES keys)	2.5
18.08.2021	APPENDIX	Remote/Keyless part programming for 2003-2009 models	2.6
26.11.2021	5.1	Key Learning for Corolla/ Camry 2018+	2.7
28.06.2023	5.1	Remove a section, information available in Toyota Online User Manual	2.8

1. Introduction

Congratulations on choosing our wonderful product!
"Abrites Diagnostics for Toyota/Lexus/Scion" is a Windows PC based diagnostic software for Toyota, Lexus and Scion vehicles. With the help of this software you can perform complete diagnostic operations of all vehicles. For proper operation of your diagnostic software you will need a corresponding interface for connection between your PC and vehicle named "AVDI". AVDI is an interface produced by Abrites Ltd. intended to act as an interface between the PC and the electronic control units.
AVDI should be used with ABRITES software produced by Abrites Ltd.

ABRITES is a trade mark of Abrites Ltd

2. Vehicle diagnostics with Abrites for Toyota

2.1 Scope of the manual

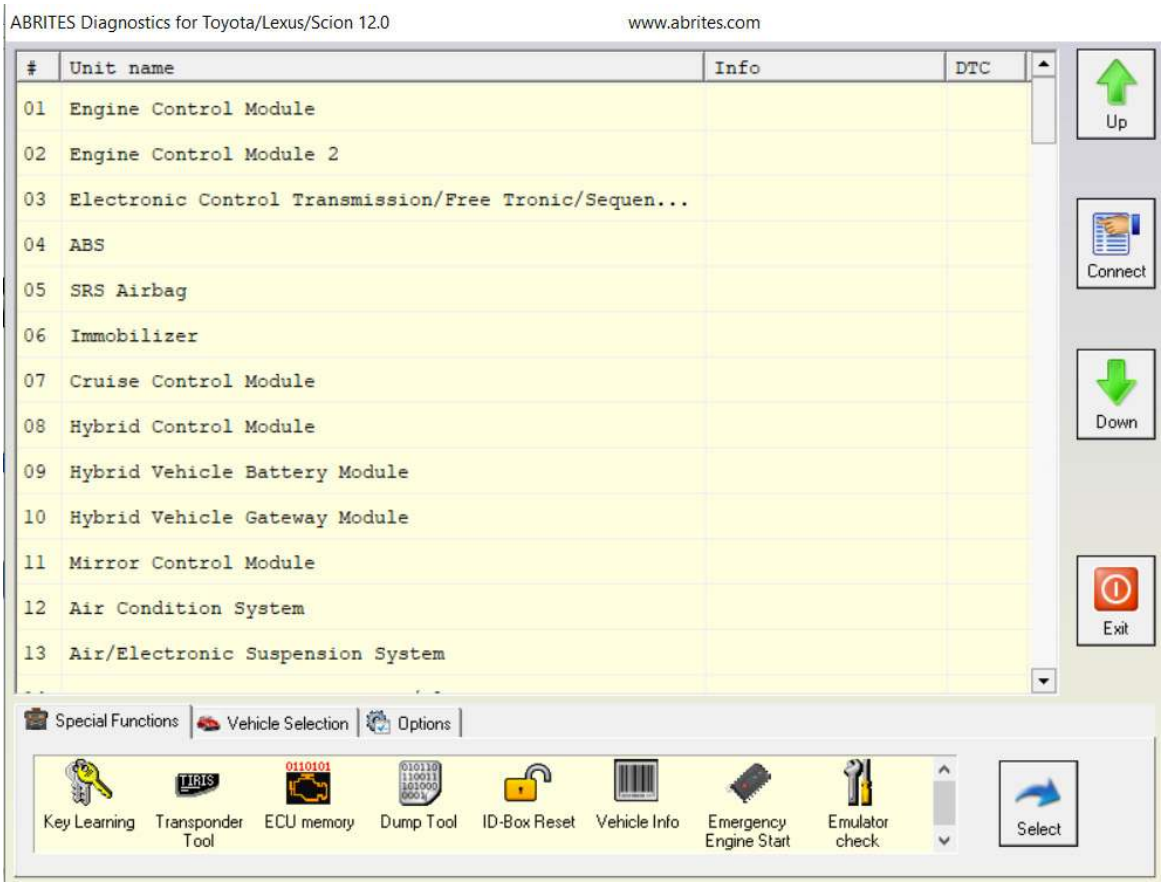
This document describes the usage of Abrites Diagnostics for Toyota / Lexus / Scion. The document is applicable for the software versions 9.3 or newer. In this manual we suppose that software for your AVDI interface is already installed. Please refer "AVDI Common User's Manual" in case it is not.

System requirements:

- Minimum system requirements – Windows 7 SP1 + 2GB RAM (recommended 4GB)

2.2 Getting Started

You can start Abrites Diagnostics for Toyota/Lexus/Scion by starting the Abrites Quick Start application and selecting Toyota, Lexus or Scion.
When the diagnostic application is started the main screen of the application will appear

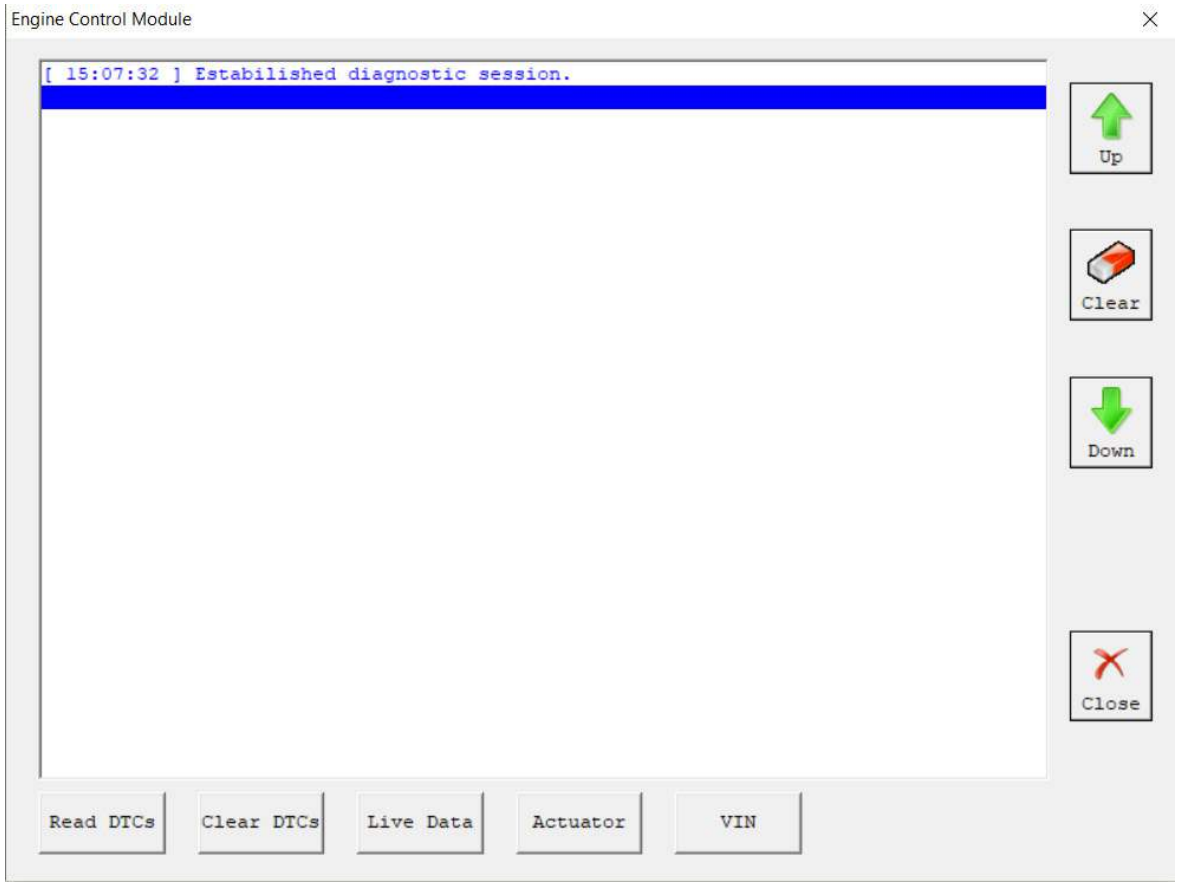


The screen is divided in two parts – the upper part where all electronic control units assembled in Toyota, Lexus or Scion vehicles are listed and the lower part of the screen where the additional special functionalities available in your diagnostic software are listed.

The lower part of the main screen can be used for selection of a vehicle model and group of electronic control units displayed in the upper part of the main screen.
Displayed functionality on the lower part of the screen can be exchanged by pressing the Special Functions or Vehicle Selection options.

3. BASIC DIAGNOSTICS

As described you can establish a diagnostic session with most electronic control units in the vehicle. When the diagnostic session is established the basic diagnostic screen will appear.

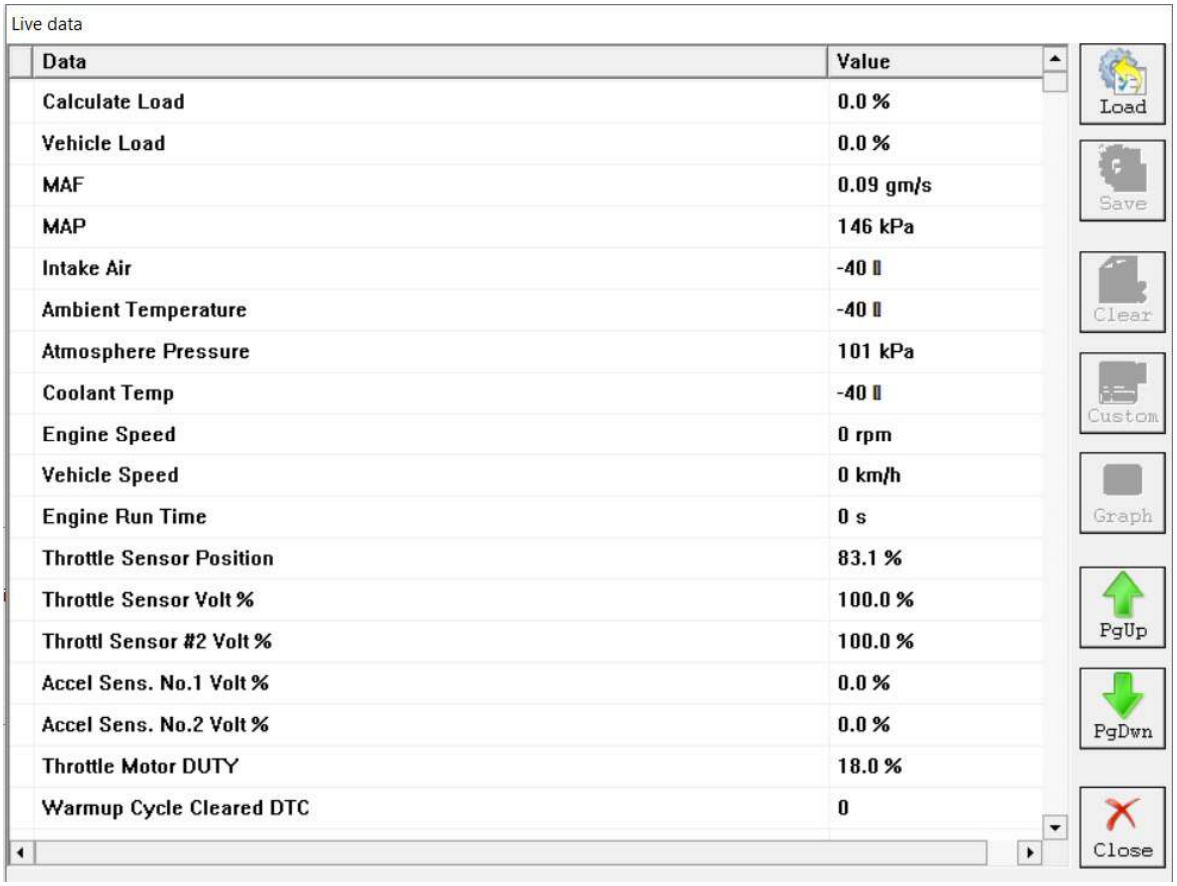


If for some reason the diagnostic session can not be established you will be notified.

In the basic diagnostic screen you have a choice to read registered DTCs, clear them, display live data or to perform other actions from the "Special" button.

- To read all DTCs press the button "Read DTCs" - all DTCs with their status – current, history or pending will be displayed.
- Each DTCs is described with its number (Uxxxx, Bxxxx or Cxxxx) and with a detailed description
- To clear stored DTCs in the electronic control unit press button "Clear DTCs".

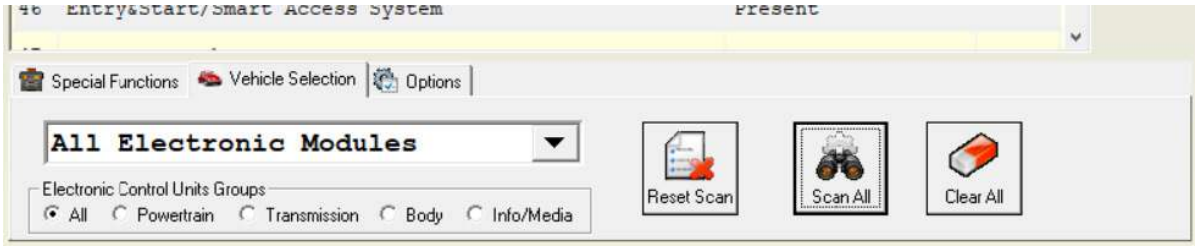
Live data or so named measured values is data sampled by the electronic control units giving us a detailed view of the current status of the corresponding unit.
Simply press the "Live Data" button and everything available from the current unit will be displayed
A list with the units where live data is available is present in appendix A.



Your diagnostic tool can provide you with a wide range of additional special diagnostic procedures available by pressing the button "Special".
In the appendix "B" a list of currently available special functions depends selected unit is present.

By selecting the 

tab placed on the main screen of your Abrites Diagnostics for Toyota/Lexus/Scion you will have an option to select the exact model of your vehicle or group of electronic control units. These options are useful to you because they will reduce the amount of displayed electronic control units on the screen. Additionally this amount can be reduced by clarification of control unit purpose group – power train, transmission, body and infotainment.



Once the set of displayed units is defined you can perform the following actions for the units on the list:

- Check availability and DTCs for all units from the list (SCAN) – press button 

- Clear all DTCs in the list – press button 

- Reset SCAN data in the list – press button 

4. SPECIAL FUNCTIONS

The ABRITES Diagnostics for Toyot a/Lexus/ Scion has some unique diagnosti capabilities, which are not supported by other diagnostic tools. These functions are accessible from the Special Functions tab on the main screen.

Please, note that depending on the version you have purchased some of these functions may not be available in your configuration. In this case a message will inform you that you need to acquire an additional license.



5. SPECIAL FUNCTION "KEY LEARNING"

Important: Key Learning functionalitiies for vehicles produced after 2018 and equipped with smart systems are explained in the Toyota Online User Manual

When the "Key learning" special function is selected it is very important to follow the exact directions of the application.

This function will automatically recognize one of the following types of anti theft systems used in your vehicle:

- Immobilizer system integrated in the engine control module (4C transponder)
- Separate immobilizer control unit synchronized with the engine control module(4C transponder)
- Separate immobilizer control unit Tokai Rika I-generation (4D transponder (40bit))
- Separate immobilizer control unit Tokai Rika II-generation (4D transponder (40bit))
- Separate immobilizer control unit VALEO (4D transponder (40bit))
- Separate immobilizer control unit VISTEON (4D transponder (40bit))
- Separate immobilizer control unit Tokai Rika (G-type key (80bit/DST80))
- Separate immobilizer control unit Tokai Rika (H-type key (128bit/DST AES))
- Smart Access System ((G-type key(80bit))
- Smart Access System ((H-type key(128bit))

You will also be asked about existing working keys. If similar master keys are not available you will have an option to reset immobilizer or smart module and to set it in "after sale" mode.
In any case if you have an existing working master key for this vehicle the following programming of new keys will be available without the need to reset the anti theft system.

Please take into account that this function is related only to the transponder part of the key. If you need to program a remote control you should use the main diagnostic screen, to enter the"Main Body" control unit and to press the button "Special".

Important:

- Once you start the smart-key learning procedure do not close the driver side door or switch the ignition off until a master key is not learned.
- Once immobilizer has been reset program at least two keys before next attempt for reset of the immobilizer. If you try to reset the immobilizer while it is in key learning state it will be destroyed permanently and you can fix it only by "Dump Tool"
- At least one MASTER key should be registered in the immobilizer system.
- MASTER key should first be programmed i.e. after reset of the immobilizer system the first key programmed should be a MASTER
- In many cases immobilizers need registration of at least of two keys to finalize the learning process

Immobilizer system integrated in the engine controlmodule (4C transponder):

This immobilizer system uses 4C transponder (or TPX1 for emulation).
Used in cars until 2003/2004.

There are two key programming options:

- Key programming via OBDII - all you need to do is to open the Key learning special function, let the software identify the immobilizer and follow the onscreen messages. If all keys are lost you could use a TPX1 transponder and place it into the PROTAG programmer when requested by the software.

- Key programming by dump - read the ECU memory using the ECU memory special function > program a transponder using the Transponder Tool special function > Transponder by dump. Once the transponder is programmed you could write the new dump to the ECU using the ECU memory special function.

In case you are using a TPX1 transponder, it should be prepared as Tiris 4C universal key (TPX1) from Transponder Tool > Production > Tiris 4C/4D > Tiris 4C universal key (TPX1).
TPX1 is an emulator of the 4C transponder and it is used fro cloning of a 4C transponder
The 4C transponder should not be prepared before programming as it has an ID which is written into the immobilizer during the key programming procedure.

Separate immobilizer control unit (immobox) synchronized with the engine control module (4C transponder):
This immobilizer system uses 4C transponder(or TPX1 for emulation). There are two key programming options:

- Key programming via OBDII - all you need to do is to open the Key learning special function, let the software identify the immobilizer and follow the onscreen messages. If all keys are lost you could reset the immobilizer.

- Key programming by dump - read the EEPROM memory of the immobilizer using the ABPROG software > program then a transponder using the Transponder Tool special function > Transponder by dump > load the EEPROM dump and program the transponder. Once the transponder is programmed you could write the new dump to the EERPOM memory using the ABPROG software.

In case you are using a TPX1 transponder, it should be prepared as Tiris 4C universal key (TPX1) from Transponder Tool > Production > Tiris 4C/4D > Tiris 4C universal key (TPX1).
TPX1 is an emulator of the 4C transponder and it is used for cloning of a 4C transponder
The 4C transponder should not be prepared before programming as it has an ID which is written into the immobilizer during the key programming procedure.

Separate immobilizer control units (immobox) using a 4D transponder:

- Separate immobilizer control unit Tokai Rika I-generation (4D transponder (40bit))
- Separate immobilizer control unit Tokai Rika II-generation (4D transponder (40bit))
- Separate immobilizer control unit VALEO (4D transponder (40bit))
- Separate immobilizer control unit VISTEON (4D transponder(40bit))

These immobilizer systems use 4D transponder. Used in 2002-2009 cars but still used in some US car models.

There are two key programming options:

- Key programming via OBDII - all you need to do is to open the Key learning special function, let the software identify the immobilizer and follow the on-screen messages.

- Key programming by dump - read the EEPROM memory of the immobilizer using the ABPROG software > program then a transponder using the Transponder Tool special function > Transponder by dump > load the EEPROM dump and program the transponder. Once the transponder is programmed you could write the new dump to the EERPOM memory using the ABPROG software.

Before programming the transponder it should be prepared as ID67, ID70 etc. from the Transponder Tool > Production > 4C/4D menu.
The 4D transponder could be emulated on DST80 transponder (page 3 writable), TPX2 transponder or ***TA36 Abrites key.***

Separate immobilizer control unit (immobox) Tokai Rika (G-type key (80bit/DST80)):

These immobilizer systems use G-type key(DST80).

There are three key programming options (adding a key, all keys lost, cloning of a key):
Key programming via OBDII - all you need to do is to open the Key learning special function, let the software identify the immobilizer and follow the on-screen messages. If all keys are lost you could use a TPX1 transponder and place it into the PROTAG programmer when requested by the software.

Key programming by dump - read the EEPROM memory of the immobilizer using the ABPROG software > program then a transponder using the Transponder Tool special function > Transponder by dump > load the EEPROM dump and program the transponder. Once the transponder is programmed you could write the new dump to the EERPOM memory using the ABPROG software.

Before programming the transponder it should be prepared as DST type 36,37,56,57,93, 97, 98 from the Transponder Tool > Production > DST80/DST+ menu.
It is possible to use a ***TA36 Abrites key.***

Some of the immobilizer control units are reset after 15 minutes or more, it depends on the software version not on the part number of the unit.
After immobilizer reset the unit is in Auto key learning state and it could remain in that state until 2 or more key are programmed. We can try exiting the Auto key learning state by depressing the brake pedal 5 times.
A DST80 transponder could be prepared only once.

Separate immobilizer control unit (immobox) Tokai Rika (H-type key (128bit/DST AES)):

These immobilizer systems use H-type key (DST AES).

You can find three different immobox types:
- 1st generation US market vehicles.
- 1st Generation EU market vehicles.
- 2nd generation

Here are the key programming options:

- **Adding a key via OBD(it is a wizard functionality and we need the car and working key from it) -**

For adding a key we need to have a working key and a used or new key. If you use a new key it has to be prepared prior to starting the procedure.
Once we start the software and begin the key programming procedure we receive a message to put the car in ignition ON. We do this and move to the next step The software will then ask us whether we would like to reset the module (this is done ONLY when all keys are lost).

Abrites Diagnostics for Toyota will then ask us to turn the ignition ON using a working key.
This is exactly what we are to do. Bare in mind the following specifics depending on the different equipment of the vehicles:
1. For cars equipped with "Key in switch" we only place the new key in the key slot and we do not turn the ignition to the ON position.
2. For cars not equipped with "Key in switch" we turn the new key to the ON position.
We can then add another key or store the current key and exit the procedure. We can use new keys, used keys or the **Abrites TA30 key.**

- **All keys lost (separate immobilizer control unit)**

1. We start by performing a reset of the immobilizer because after resetting we can add keys.
2. If this does not work we move to sniffing the communication with Abrites ZN068 Abrites adapter for Toyota H
3. Internal connection of fuses and key switch

We DO NOT need to know the exact immobilizer generations. Abrites diagnostics for Toyota will detect the three types. It will try to detect them in the following order:

1st Generation US market vehicles.
1st Generation EU market vehicles.
2nd Generation

We MUST NOT stop the software, unplug the USB or the PC under any circumstances because we will need to restart the whole procedure including all the preparation we have undergone.
1st Generation US market can be reset. Systems of this type can be reset even if no master key is available.

We need to start the Abrites diagnostics for Toyota and when we see the message for reset. We then select "Yes". The software will then show us a message to turn ignition OFF but keep the key in the key slot. In 15-30 minutes we we will see a message from the software saying that the IMMO is successfully reset. After that the car is in "Auto learning mode". This means that the first key you turn the ignition ON with will be programmed.
If the software is unable to reset the IMMO you will receive a message within the first 30 seconds. This means that the car is probably equipped with an H chip. The Abrites diagnostics for Toyota will try 1st Generation Toyota EU.

1st Generation Toyota EU starts by a message requesting the car to be in the ignition ON and the ZN068 Abrites adapter for Toyota H needs to be placed near the antenna for 30 seconds. If this is the IMMO we have this means that we can prepare the sniffer as a master key. Once that is done we can enter key programming (we already have a master key).

If the car is not 1st Generation we get a message that the sniffs were not enough and we attach the ZN068 Abrites adapter for Toyota H and continue .

Under NO circumstances should we stop the procedure or take out the USB, stop the PC, etc.
If we do this we MUST start the whole procedure over again.

We then connect the ZN067 to the AVDI and we start looking for the fuses for the IMMO – Battery fuse, ignition fuse and key in switch fuse (we need to have a wiring diagram available for the particular model we are working with). Good practice advise: Check the live data if you do not know what is what and see if by removing a certain fuse you see the live values for what you need as inactive.

It is hard, the fuses are different, and we need to pay special attention when dealing with these cases.
We need to always confirm all of our connections, If we have made an error somewhere the software will notify us and we need to go over our steps once more to confirm.

Once all is confirmed as OK the software will start a reset. This takes up to 30 minutes (in most cases you we need to wait around 5-6 minutes). Once this process ends the ZN068 Abrites adapter for Toyota H will beep five times and the software will say that the secret key is found and attach the sniffer. This is exactly what we do and then we press the button to prepare it as a master key for this vehicle.
The next message will ask us to return all the fuses to their original places as well as the key in switch. We do that if we have one and then we turn the ignition ON.

We are now done with the hard part of the procedure. You just need to know that the ZN068 Abrites adapter for Toyota H will be a master until we disconnect the AVDI or the ZN068 Abrites adapter for Toyota H. Until we do that we can program keys with it or use it to start the car.

After we turn the ignition ON the software automatically enters key programming. The procedure is once again dependent on the type of equipment you have. You can use basically any key – new, used or the TA30 Abrites key

Once we have programmed the keys, we can go into module 6 by diagnostics and we can delete the previously programmed keys (in case the customer has lost them and is afraid they can be found by someone else). This may not work 100% for all models but they are being added as we upgrade the versions of the Abrites Diagnostics for Toyota.

Keep in mind that the ZN068 Abrites adapter for Toyota H and TA30 are reusable and you do not need to buy a separate sniffer for each car you do.

Here are some examples for connection to the battery and ignition fuses:

Toyota Hilux 2015-2017
Battery fuse - 10A ECU-B NO.2
Ignition fuse - 5A IG2 NO.3
Key switch present (pin 3)

AyGo 2014-2020
Battery fuse - 7.5A AM2 NO.2
Ignition fuse - 5A IG2 NO.2
Key switch not present

Corolla/Auris 2011-2014 / 2018-2020
Battery fuse - 10A ECU-B NO.2(Except 1WW)
10A ECU-B2(1WW)
Ignition fuse - 7.5A IGN

Additional information regarding the usage of the ZN067 cable and identifying the correct fuses needed based on best practices.

We know looking for the correct fuses for the Toyota ZN067 procedure can prove difficult. For this reason we suggest to always use the factory wiring diagrams, however this is not always possible when working on a car.

Based on our practice we have found a way to look for the correct fuses where you can connect and know they are 100% the fuses you need to complete the All Keys Lost H type mechanical key procedure. We use live values from Abrites diagnostics for Toyota and we start taking the fuses out one by one.

As you know you need to find the following:
1. Battery (B+)
2. Ignition switch (IG SW)
3. Key switch (KEY SW) – you do not really need to find this as you just disconnect the connector going directly into the ignition switch and connect the appropriate cable from the ZN067 to it. This often involves removing so plastic part but this is not a problem as there is no alternative solution to AKL situations.

So if you open the diagnostics menu, go to the immobilizer module and press the LIVE DATA button. You will see this screen:



As you can see the value for the +B, IG SW and KEY SW are all stated as NORMAL or ON.
As you start pulling the fuses out you can monitor the live values for these three. Pull a fuse, wait a few second, put the fuse back if you do not see change. Keep doing this until they are disabled and you know you have your correct fuse. Another very useful thing to note is that the correct fuses are almost always the same size as the ones on the ZN067 and usually vary from 10A to 20A so there is no point in going through large fuses. Once you find your needed fuse you will see that the value for +B, IG SW or KEY SW changes from a positive value (for example ON) to a negative (for example OFF).

Just as a reminder we would like to remind you that the YELLOW cable goes to the B+ and the ORANGE cable goes to the IG SW. The smaller cable is destined for the KEY SW.

In order to assure that we are always working with the correct fuses we need to keep in mind that the there are sometimes more than one fuse for B+ and/ or IGN.

If the car you are working on has more than one fuse - please make sure to always start by finding the fuse with the lower amperage value.
Example: you have 2 fuses for B+, one is 15A and the other is 5A. In this situation ALWAYS try the 5A fuse first.

Key programming on bench
For this procedure you will need to follow the on-screen messages and connect to the immobilizer unit using the Abrites ZN067 Abrites adapter for Toyota H. Please use transponder tool to enter "H" keys



Here is the connection diagram for bench reading with ZN067 adapter:



ZN067 Toyota mechanical key (H-type) adapter



ZN068 Toyota mechanical key (H-type) adapter



Cloning a key

For cloning a key we ONLY need the working key itself and not the whole car. It is done through the Transponder Tool special function > Cloner.

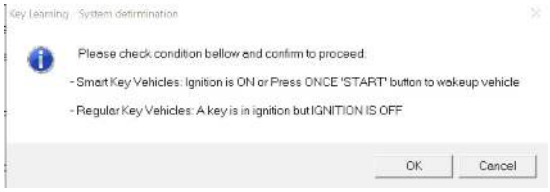
You will need a PROTAG programmer. You can only clone a key over a TA30 transponder.

Using the ZN039-2 hardware to perform key learning (smart systems)

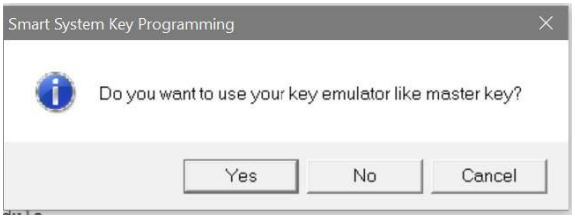
The Abrites ZN039-2 adapter is the new tool designed by Abrites to perform key learning on all Toyota Smart key vehicles. It is used to emulate a master key when no master key is present so as to perform key learning on the vehicles. With the help of this tool you no longer need to take the car apart, take out the Smart system, read the EEPROM, load into the transponder tool and make a Master key. Instead you can emulate a master key and add another to the vehicle.



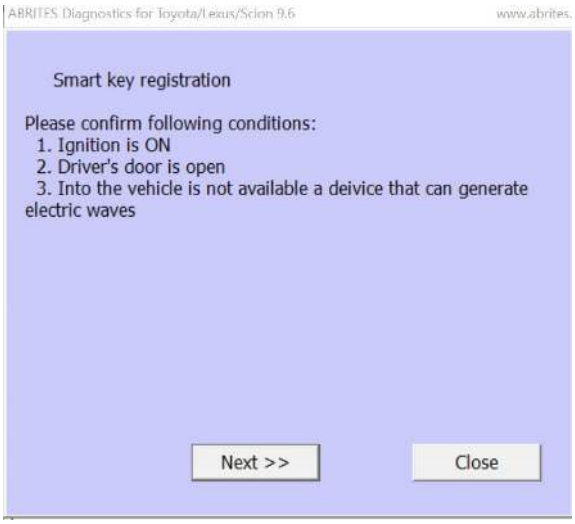
1. Press “Key learning” special function and follow the instructions:



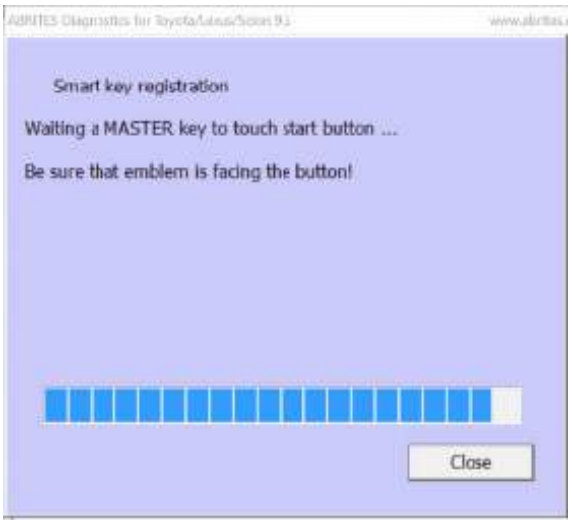
2. Turn the ignition ON and continue:



3. Here choose that you want to use the ZN039 as a MASTER KEY EMULATOR



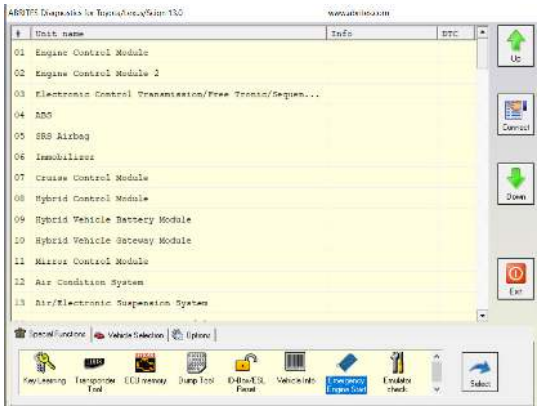
4. Simply follow the instructions.



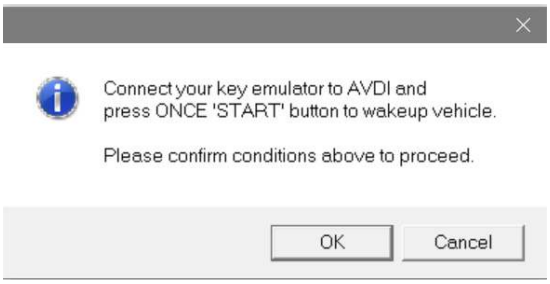
The ZN039-2 will be accepted as a Master key and you can continue to learn a new slave key and reuse your ZN039-2 adapter in the future.

Using the ZN039-2 adapter as an EMERGENCY START tool for Toyota/Lexus/ Scion/Subaru Smart access cars.

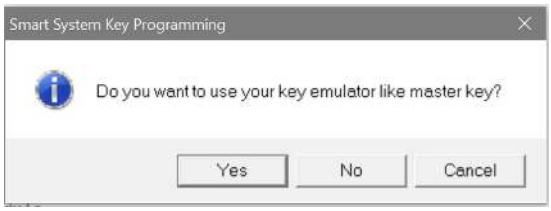
Here you need to select the “Emergency start” special function:



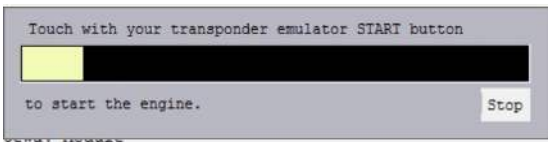
From then on follow the instructions:



Turn the ignition ON.



Confirm that you want to use the Emulator as a master key.



After that the car will start with your ZN039-2 Emulator. And you can drive it to a workshop where you can perform key learning.

IMMOBILIZER modules replacement:
In order to be able to perform immobilizer parts replacement you need to have a working key which we need to confirm via the live data on the immo module if we cannot verify in another way i.e. start the car.

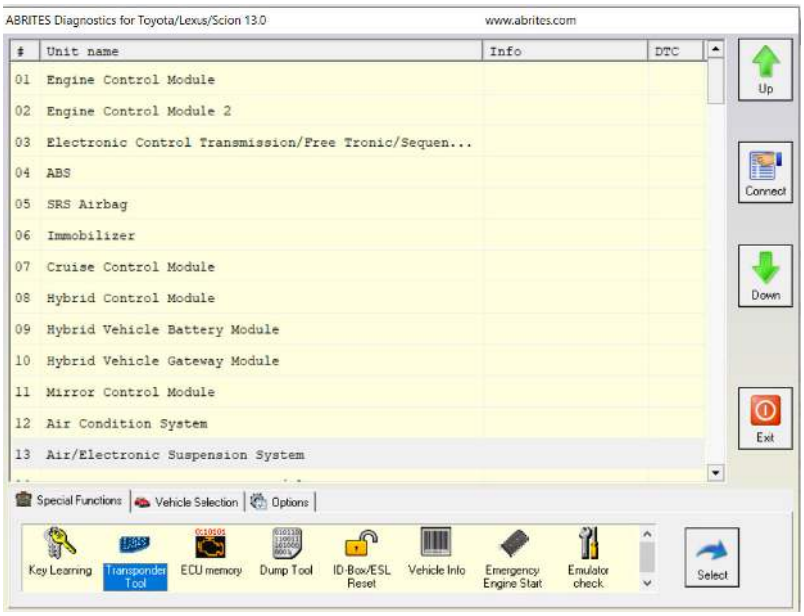
ECU exchange:
We need to place a new or used ECU of the required type in the car and put the ignition ON. We then need to short out the OBD pins which we need to check according to the specific car. 30 minutes later we will have full light mode on the cluster and it will start blinking intensively.
Once the 30 minutes are over and we see that we remove the short we have made in the beginning, turn ignition OFF, wait a minute or two and start the car.

IMMO BOX exchange:
For this procedure we do not need a working key, all we need is a replacement (new or used IMMO BOX), we do not need a key for the box itself either. We place the new IMMO box in the car, perform one of the ALL KEYS LOST procedures as per the vehicle you have and then we perform the ECU exchange so as to adapt the IMMO BOX to the ECU.

6. SPECIAL FUNCTION "TRANSPONDER TOOL"

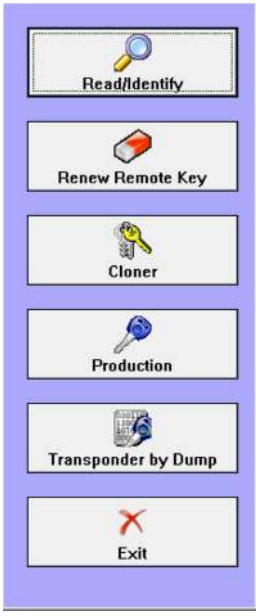
Before usage of special function "Transponder Tool" please be sure that your PROTAG transponder programmer is connected to your PC.

When your PROTAG transponder programmer is detected a list of sub functions will appear – Identification of a key or transponder, Cloning of a key/transponder, Preparation (production) of transponders ready for usage with Toyota/Lexus/Scion vehicles, Programming transponder by the dump of immobilizer/smart system.



Before usage of your programmer please take into account:

- while operating the antenna of the transponder the programmer should be kept away from metal surfaces
- key or transponder should be placed in the PROTAG to allow proper reading and programming.



6.1 Identification of a key or transponder

If you have a key or transponder simply place it near the antenna of the programmer and press the "Read/Identify" button. A message about type of your transponder and content programmed will be displayed . If your transponder is some of the known transponder types information about this type (e.g. Texas Crypto 4D type ID67 – Master) will be displayed .

Abrites Diagnostics for Toyota/Lexus/Scion will try to recognize ONLY transponders/keys used in Toyota/Lexus/Scion vehicles. These types are as follows:

- Fixed transponder Texas 4C. This type of transponder consist of only identification number and do not contain any authentication logic.
- ID33 transponders – this is another type of transponders that are using fixed numbers programmed in the transponder and are used for identification by the immobilizer system.
- Crypto transponder Texas 4D. This type of transponder consist of a set of data fields programmable by the user than can be used from immobilizer system to decide whether the key has been programmed in the vehicle. In addition this transponder provides the ability for programming of 40 bits secret keys which can be used by immobilizers to identify the transponder by a special authentication algorithm. Depending on the content of these transponders they can be named as follows: ID67, ID68 and ID70.

ID67 is intended for usage by Toyota/Scion vehicles.
ID68 is intended for usage by Lexus vehicles.
ID70 is intended for usage by Toyota Europe.

- Crypto transponder Texas DST+. Generally this type of transponder is similar to Texas 4D with the exception that it provides a wide range of programmable data memory plus extended authentication algorithm – here the secret key is 80-bits.

These types of transponders are usually used in the smart systems (keyless keys) and also regular keys also known as G-chips (G-transponders).

6.2 Cloning of a key or transponder

With the help of this option you can prepare a fully functional cloning of an existing vehicle's keys. Supported keys/transponders for cloning are:

- Texas 4C fixed. In the cloned key you should use transponder type TPX1 produced by JMA Company or compatible.
- ID33 fixed. In the cloned key you should use transponder type PCF7935.

- Texas 4D transponders (types ID67, ID68, ID70). You should use an empty (brand new) transponder named TPX2 produced by JMA Company or compatible.
- G and H type keys(mechanical keys)

Important:
Currently "Abrites Diagnostics for Toyota/Lexus/Scion" NOT supports Texas DST+ transponders for cloning. This will be an issue of the next software releases.

6.3 Preparation of transponders/keys ready for usage with the vehicle

Usually when you need to add an additional key to the vehicle or all keys are lost you need to use some kind of key or transponder.
Transponder inside of the key should be with a special content in order for future programming by diagnostics to be possible.
"Production" utility provides the ability to program an empty (brand new) transponder as at transponder ready for acceptance by the immobilizer system of the vehicle.
Transponders applicable for this utility are virgin Texas 4D transponders or TPX2 transponders. Only for preparation of "Emergency 4C" key you will need a TPX1 transponder.

While transponder preparation is in progress you have a choice to select what kind of key you need to prepare – master key or sub key and also for what model vehicle it is intended.

Please take into account that the following rules are applicable for all Toyota/Lexus/Scion vehicles:
- at least one MASTER key should be registered in the immobilizer system
- MASTER key should be first programmed i.e. after reset of the immobilizer system first key programmed should be a MASTER
- In many cases immobilizers need registration of at least of two keys to finalize the learning process

We want to point out that in many cases keys ordered from Toyota/Lexus/Scion dealers can not be used after reset of immobilizer system. Reason for this is that these keys in most cases are SLAVE keys and can be used only if an MASTER key has been programmed before. With this utility you can prepare a new Texas 4D transponder as a MASTER key.
Another important issue is that once a transponder is programmed as ID67, ID68 or ID70 it can not be used for second programming i.e. it can not change its type. This is because ID67,ID68 and ID70 transponders are with locked data fields after preparation.

6.4 Preparation of a key by dump of immobilizer or smart system of the vehicle

This utility will provide the ability to prepare a key when you have the dump of the immobilizer system.

Supported immobilizer systems are:

- Separate immobilizer boxes (usually EEPROM 93C56,93C66). The latest versions of immobilizers with encrypted dumps are also supported. Genus Keys, virgin Texas 4D transponders or TPX1/TPX2 transponders should be used.
- For immobilizers integrated in the engine control unit (in most cases using Texas 4C or ID33). Genus Keys, Texas 4C or TPX1 transponders should be used.
- Smart access systems (EEPROMs 93C66 or 93C86). Only Genus Keys should be used!

All that is needed from you is to read by some IC programmer the eeprom of your immobilizer/smart module, to load it in the application, it will automatically identify the type of your vehicle and the needed transponder or key for programming. When the key is programmed with the same IC programmer you can program the new dump (modified by application) in the immobilizer/smart module back.
The generated key will work as a MASTER key so you can proceed to add additional keys by diagnostic.

Important note for Smart Systems:
Generated keys will work as master keys when placed near the START/STOP button of the vehicle.
Their remote control will not work.
To program a fully functional key you should use special function “Key learning” when availability of master key (i.e. without reset of the system, simply “add key”) is selected.
This way for programming does not require access to the ID-box of the vehicle which usually is placed at a very hard to access place.

Find bellow pictures of most popular immobilizers and smart systems:

Immobilizer control module



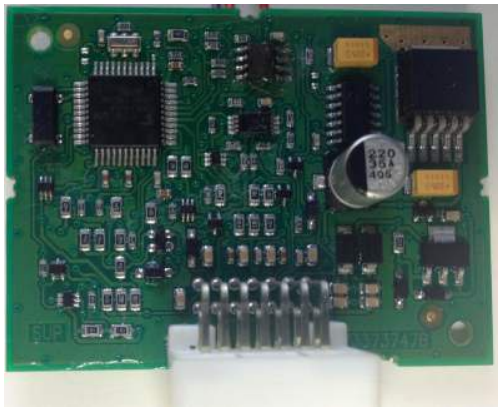
Immobilizer control module Tokai Rika. It is with EEPROM 93C66. Dump is ENCRYPTED!



Immobilizer control module Visteon. It is with EEPROM 93C56:



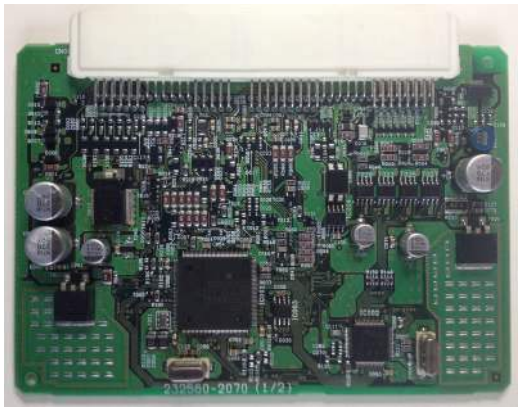
Immobilizer control module Valeo. It is with EEPROM 24C04:



Smart Access Module (so known Certification ECU):



Smart access module – EEPROM 93C86 or 93C66:



ECU-ID code or ID-Box(with external eeprom):



ID-Box with external EEPROM 93C46:



7. SPECIAL FUNCTION "ECU LASHER"

This special function is intended for tuning purposes and allows you to read and program flash memories of engine control units produced by BOSCH – types EDC15 and EDC16.

8. SPECIAL FUNCTION "DUMP TOOL"

This special function will help you when the dump of some electronic control unit is present to reset it in virgin state, to adjust mileage or to clear crash data records from airbag control modules.
All that is needed is to select the type of electronic control unit and function, to load corresponding dump and to press button "Parameters".
Once the dump is modified it should be saved and programmed back in the corresponding control unit.
Refer to Appendix C about available control units and functions available in "Dump Tool".

9. SPECIAL FUNCTION "ID-BOX RESET"

The "ID-Box" control unit is a part of the immobilizer system in the vehicles with a smart access system (keyless keys). "ID-Box" combines synchronization patterns between Smart Access Module/ESL and Engine Control Electronics.
The ID box's purpose is to "unite" the communication signals from the above modules.
In many cases the replacement of a Smart Access Module and ECU is linked to the reset of the ID-box module to it's after sale state (virgin state), this is done in order to allow acceptance of a new part to the vehicle's security system.
Generally, resetting of the Smart Access Module leads to an internal reset of the IDbox but in many cases a reset of the Smart Access Module by diagnostics is restricted. In these cases we have the option to reset the Smart Access Module and ID-box with the help of the **dump tool** (for ID-box with **an external eeprom**).
The Abrites diagnostics for Toyota/Lexus/Scion software also supports the ID-box w**ithout an external eeprom** (through direct LIN connection only).
The biggest problem is that the disassembliy of an ID-box from a vehicle is a very difficult task. Usually it is placed at a difficult location (in most cases you need to remove the dash board of the vehicle and many other parts).
For this reason we offer the option to reset ID-box by **connecting directly to the internal LIN BUS** of the car using either the **ZN051 Distribution box** or a **CB012 cable set**, Alternatively you can do that using a custom cable for connection between the AVDI and the vehicle:
Pin 1 of the AVDI Interface <-> internal LIN BUS of the car.

All that is needed to do this is:

1. Connect your

- CB012 cable set between the AVDI Interface and the CB100 OBDII cable

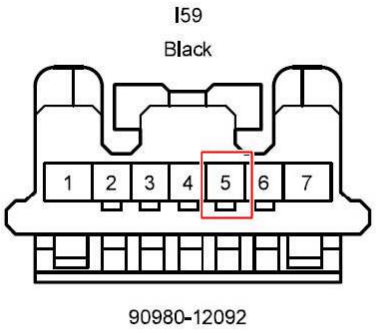
or

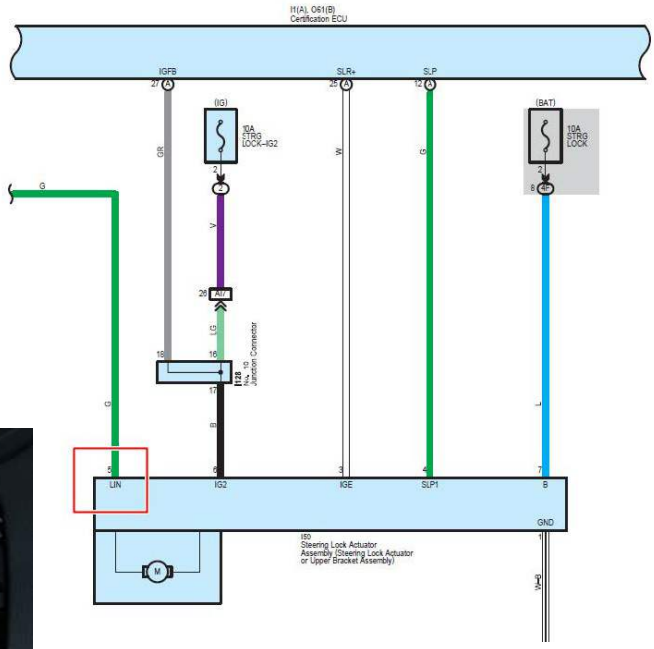
- ZN051 Distribution box between the AVDI Interface and the CB100 OBDII cable and use the K1 socket for direct connection to the internal LIN BUS of the car

2. Connect to the OBDII of the car
3. Disconnect the two connectors of the smart system (located under the glove box compartment)
4. Connect to the internal LIN BUS (red connector of the CB012, or K1 socket of the ZN051 Distribution box) of the car.

There are two options to connect to the internal LIN BUS of the car:

Option 1: Connect to pin 5 of the ESL (if available) without disconnecting the ESL connector
Here is the connection diagram of the 7-pin ESL:

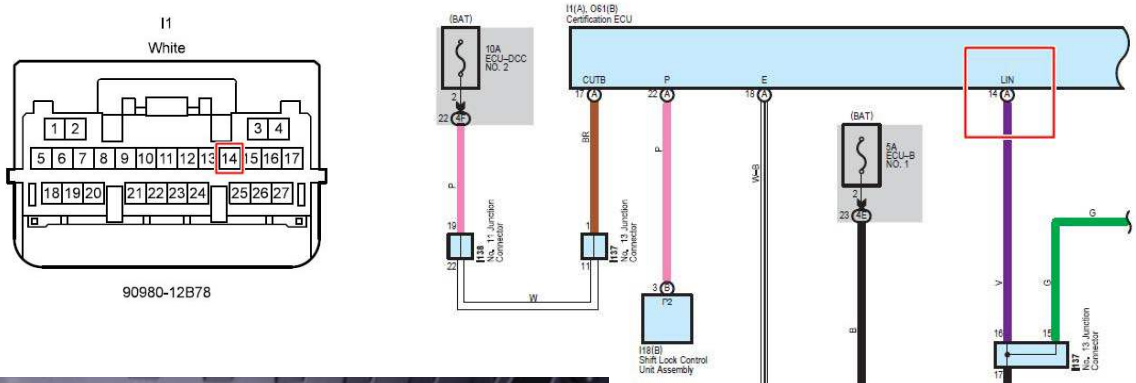






Option 2: Connect to the LIN BUS wire which goes to one of the smart system's connectors directly (this can be verified in the electrical wiring diagram of the Toyota Factory Repair Manual). The LIN BUS pin/ wire depends on the car model and configuration.

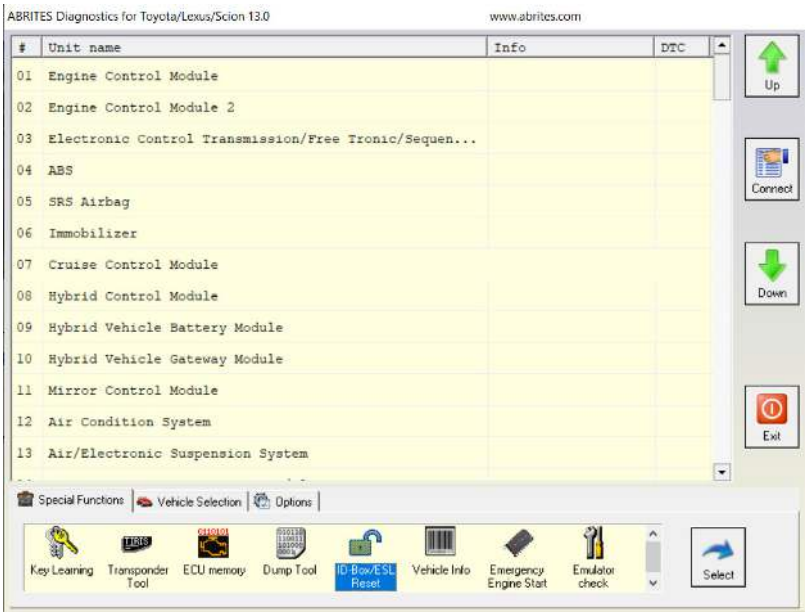
Here is an example where pin 14 is the LIN:



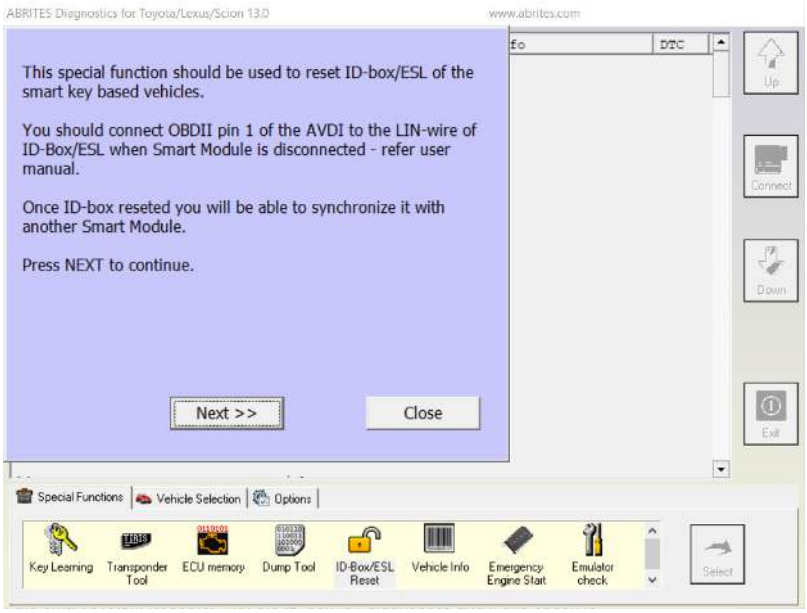


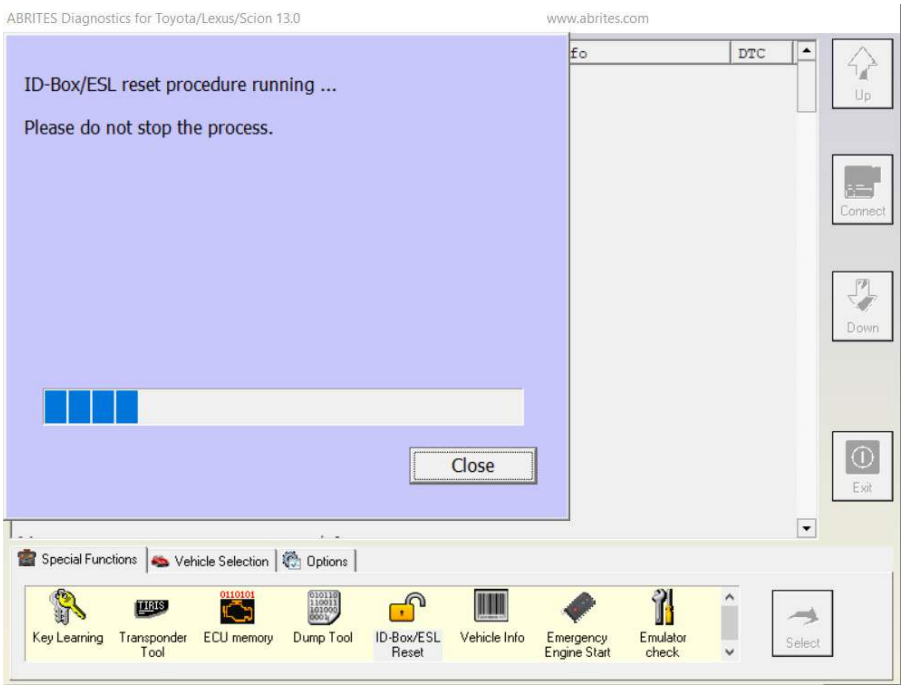
If you want to connect to the ID-box on bench for car models 2013+, you should connect to pin 2(LIN) of the ID-box (check the wiring diagram above).
The ID-box of the models before 2013 has 7 pins.

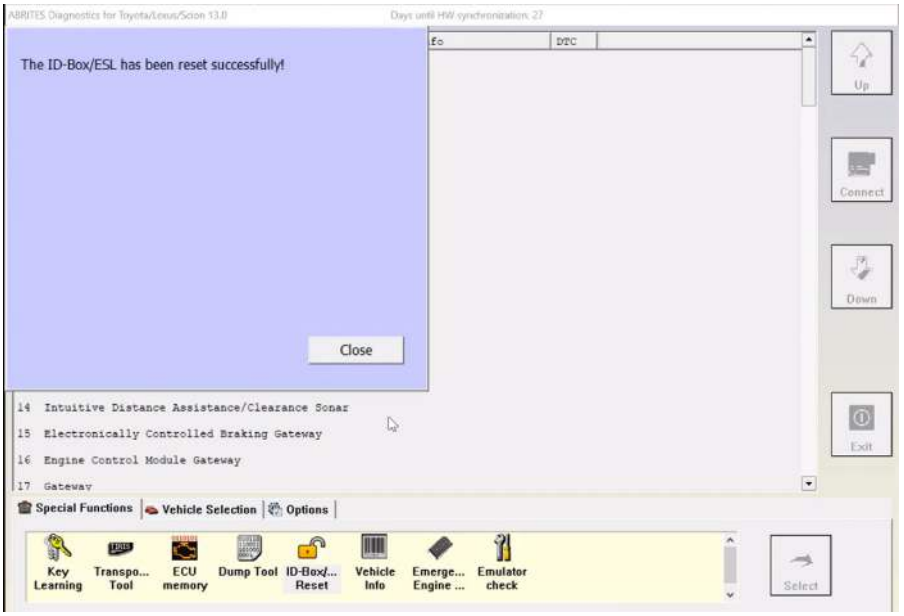
5. Start Abrites Diagnostics for Toyota/Lexus/Scion and select “ID-box reset” special function.



6. Wait until the reset procedure is done. The process will take up to 1 minute.







Important:

Be sure that you really need to reset ID-box module of the vehicle.

For key programming purposes for vehicles up to 2017 this is not needed – you have an option to try to reset of the smart system (together with the ID-box) by diagnostics and if this option is restricted you can program a working master key directly in the dump of smart module or using the ZN039-2 adapter – refer to special function "Key Learning" and "Transponder Tool". So access to the ID-box is not needed.

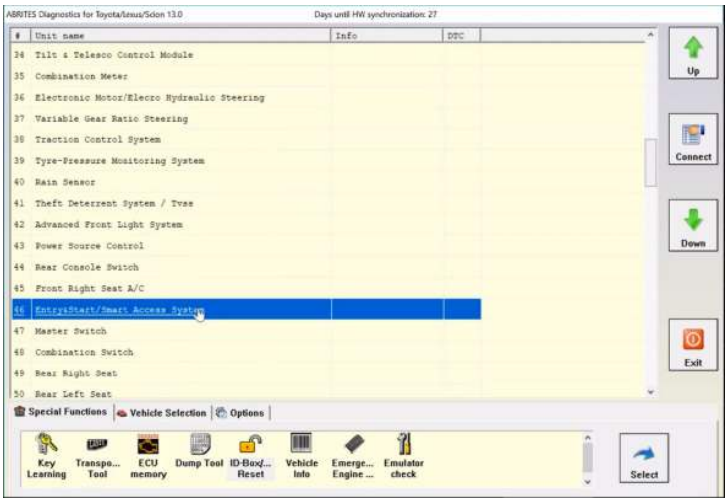
10. SMART SYSTEM REPLACEMENT (DST AES/ HITAG AES keys)

The Abrites software for Toyota/Lexus/Scion allows you to replace the smart system/steering lock of the car, including the models produced after 2018 with Hitag AES keys) with both new and used smart systems.

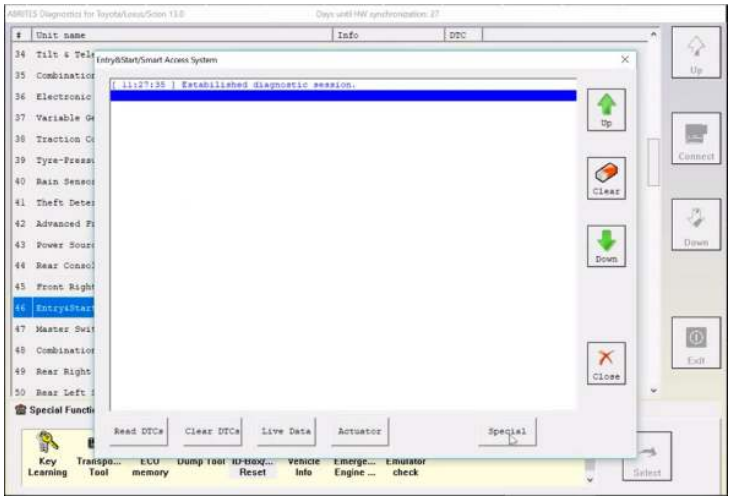
In order to replace the smart system the ID-box must be reset (check chapter 9). Both IDboxes with an external eeprom and without an external eeprom are supported.

Once the ID-box is reset and a new/used smart system is installed you can start the synchronization procedure.

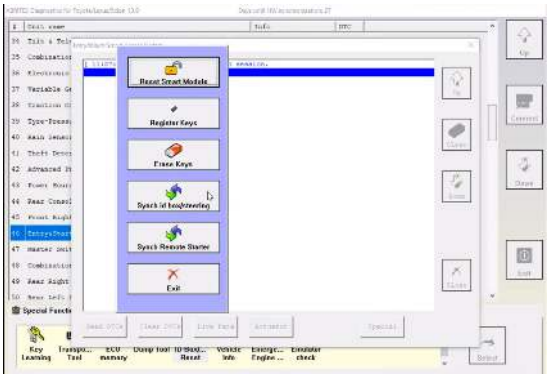
1.Start the Abrites Diagnostics for Toyota/Lexus/Scion and access the Smart System unit (module 46) through the diagnostics menu:



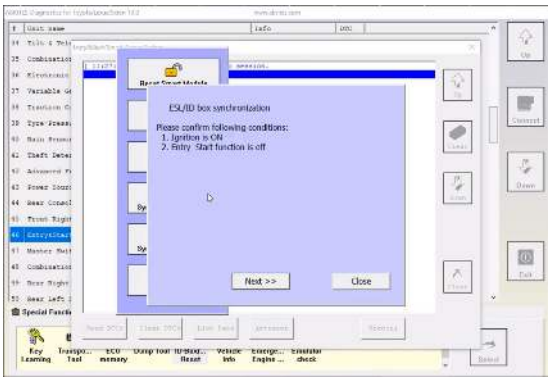
2. Press the “Special” button



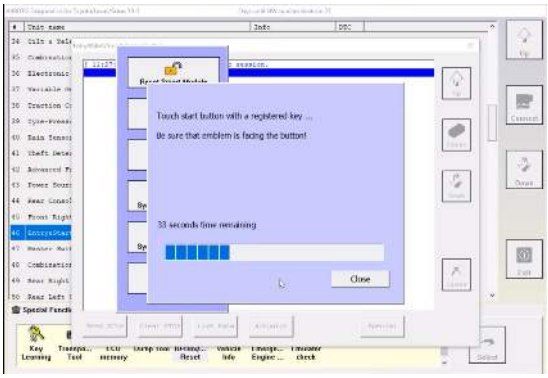
3. Press the “id box/steering” button

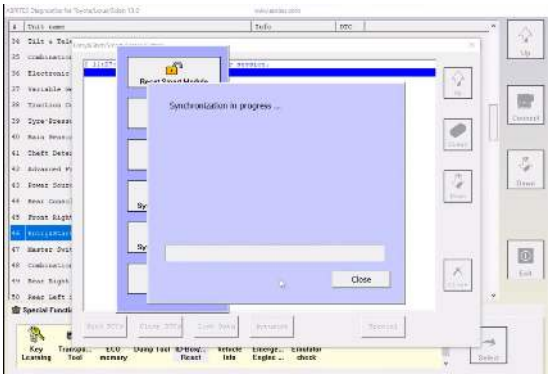


4. Turn IGN ON and press “Next”

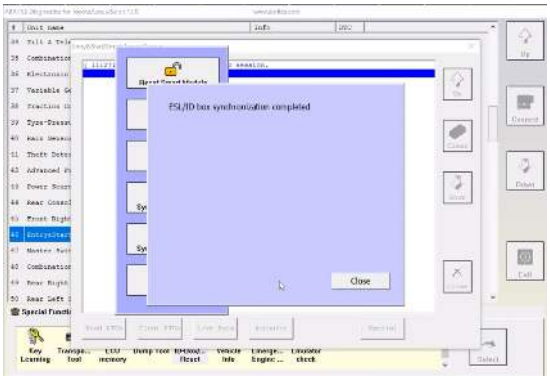


5. Touch the start button with a registered working key with the logo of the key facing towards the start button





6. The ID-box synchronization procedure is complete and the smart system is successfully replaced.



APPENDIX

Appendix A – Availability Live Data

Electronic Control Unit	Note
ABS control module	CAN bus
Cruise Control Module	
Driver Door Control Module	
ECB Gateway	
Engine Control Module	
Electronic Transmission Control Module	
Hybrid Control Module	
Immobilizer	
Master Switch	
Passenger Door Control Module	
Rear Console	
Rear Left Door	
Rear Right Door	
Entry & Smart Access Module	
Steering Pad	

Appendix B – Special functions available from basic diagnostic session

Function	Control Unit	Note
Immobilizer Reset	Immobilizer	
Register Key	Immobilizer/Smart Module/ECU	
Erase Keys	Immobilizer/Smart Module/ECU	
Synchronize	Immobilizer	Synchronization between immobilizer and smart unit
Smart Module Reset	Entry&Smart Access	
Remote Key Registration	Main Body	Registers remote key
Remote Key Deletion	Main Body	
Steering Lock Synchronization	Entry&Smart Access	Sync steering lock electronic with Smart Access Module
ECU Synchronization	Entry&Smart Access	Sync engine control module with Smart Access Module
ECT reset	Engine Control Module	Resetting learned values ECT
Leave After Sale	Entry&Smart Access	Cancel auto learning state (key learning) of the engine control module
Throttle Learn	Engine Control Module	Resetting learned values ECT
ABS reset	ABS	Reset learned values - should be used if ABS module or YAW rate/G sensor are replaced
ABS alignment	ABS	Reset learned values of ABS
Gateway reset	Gateway	Used to reset list with assembled in the vehicle control modules. Useful when some unit have been removed from vehicle (or added).
A/C Servo Motor Init	Air-condition	
EMPS Init	Power Steering	

Appendix C – Dump Tool available options

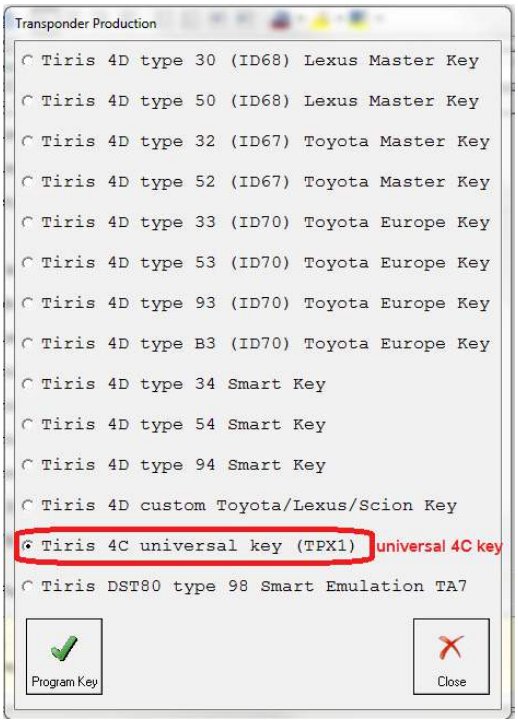
- Reset of the immobilizer

  tokai rika eeprom 93C66 (texas 4D)
  tokai rika eeprom 93C66 encrypted (texas 4D or G-chip)
  valeo 24C04 (texas 4D)
  visteon 93C56

- ID-box reset – 93C46
- Smart Access Module reset – eeprom 93C66 or 93C86
- Engine Control Unit reset (virgin)
- Engine Control Unit mileages recalibration
- Airbag Control Module – crash data clear

NOTE: For older model vehicles (those using an external IMMOBILIZER and a 4C type of key) All users are advices to use a universal key (this key can be generated via the production menu). Using this key the user can add a new key without removing the immo box.

It is advisable for everyone using the Abrites diagnostics for Toyota/ Lexus/ Scion to have such a key. Please note that you will need a PROTAG programmer for this production.



Appendix to the procedures for smart key learning

Please follow the instructions as described below:
1. Please locate and remove the smart system (usually located behind the glovebox)
2. Read and save the 93C86 EEPROM from the smart system. Use a programmer
3. Open the Abrites diagnostics for Toyota - go to special function Transponder tool and select Transponder by dump.
4. Load the 93C86 EEPROM and the software will tell you what type of transponder you need
5. The software will modify the dump in a way that you will be able to have a master key. You need to write this modified dump to the Smart unit.
6. Now you have a master key and the car can be started.
7. Use the Key learning to learn a second key. You now have a master and slave key.

if you prefer to use virgin dumps follow the procedure bellow:

1. Be sure that smart system and ID box are virgin
2. Connect units to the vehicle DO NOT TOUCH START BUTTON!
3. Connect Abrites Diagnostic for Toyota and select function “Key Learning” - DO NOT TOUCH START BUTTON just leave the door open.
4. Register 2 keys (follow instruction on the display)
5. Disconnect the AVDI
6. Close driver door and try each remote
7. Open driver door
8. Turn ignition ON (for first time)
9. Short PIN 4 and PIN 13 of the OBDII for 45 minutes
10. Turn OFF ignition
11. Remove the link between pin 4 and pin 13
12. Close the door
13. Open and close 6 times with each remote control
14. Leave the vehicle for 5 minutes locked
-> units are synchronized

Appendix to the remote/keyless part programming for smart key learning (2003-2009 models)

Please follow the instructions as described below:
1. Close all doors except driver's
2. Insert and remove key from slot twice
3. Close, Open, Close, Open driver's door
4. Insert and remove key from slot
5. Close, Open, Close, Open driver's door
6. Insert key in slot
7. Close driver's door
8. Turn IGN ON and OFF
9. Remove key from slot - door locks cycle
10. Press and hold the lock and unlock button for 1 second, release and then press lock button for 3 seconds
11. Locks cycle
12. Open, Close, Open driver's door

Note: This procedure is valid for the oldest keyless-entry system (e.g. Toyota Prius second generation XW20 2003-2009).