

## CAN BUS vehicle coverage and functions:

Currently covered CAN-BUS models:

- L319 Discovery 3/LR3 2005 to 2009
- L320 Range Rover Sport 2005 to 2009
- L319 Discovery 4/LR4 2010 to 2014
- L320 Range Rover Sport 2010 to 2013
- L322 Range Rover 2010 to 2012
- L316 Defender 2.2 Puma 2010 to 2013
- L316 Defender 2.4 Puma 2007 to 2010 (partial CAN-BUS)
- L359 Freelander 2 2007 to 2012



**!** IMPORTANT: Unlike traditional multi-model vehicle diagnostic equipment, for CANBUS vehicles, the Nanocom has NO vehicle model or ECU menus to select from, instead, under the CANBUS VEHICLE option, the Nanocom initiates a "VIN detection" function, which tells the unit exactly which vehicle is currently connected. After the VIN detection process, there is a list of diagnostic and service functions. These are currently (V1.24 onwards):

- Fault Codes - reading, saving and clearing.
- ECU Information (full ECU specifications)
- ECU Programming/Modified CCF uploading
- Service Functions- Service and Oil light reset
- Air Suspension (EAS)
- Park Brake
- Adaptive Values Reset
- Read/Save CCF
- CAN Instrument Mode (Live Data on the Move)
- Clutch Calibration (Transfer Case Control Module)
- CCF Sync (Body Control Module synchronisation)



## CAN-BUS Dynamic menu system

With the release of the Nanocom firmware V1.24 (May 20th, 2014) the method for building the CAN-BUS menu when first connecting to a CAN-BUS vehicle has changed. The Nanocom will run it's smart vehicle detection process, upon doing so, you will only be given the functions supported by the Nanocom that are relevant to the connected vehicle.

The reason behind this is to avoid having applications and functions in your menu that do not or should not be applied to your vehicle. You can track the latest added features and functions via the Master Change Log, which you can download from your Members Restricted Area.

This Manual also contains all the Can-Bus functions and some might or might not apply to your vehicle. The different functions that do not apply to all the Can-Bus vehicles are contented in separate labeled sections.

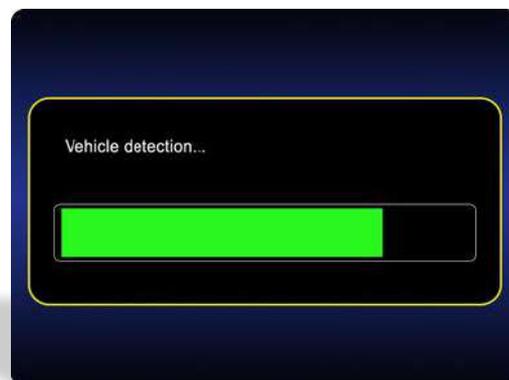
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## VIN Detection function:

When any option is selected, the Nanocom Evolution will first run the short VIN detection function through which it will communicate with the vehicle and identify the precise model, year, engine and transmission type, as well as any other information the Nanocom might require to proceed.

Dynamic Menu System: From firmware version 1.24 and onwards, the Nanocom Evolution will now compile the CAN-BUS menu functions specific to the connected vehicle.



## Fault Codes:

The diagnostic functions provided under this option are identical for all CAN-BUS based Land Rover Vehicles, as they all follow the ISO 14229 standard as defined by the International Standards Organisation. This standard is independently documented on the Internet for more detailed reference and information, but it's main feature is in its additionally categorising of Fault Codes as "Tested" or "Not Tested"

As such, this diagnostic function provides six sub-function options which are:



The first three functions simply read the **tested**, **not tested** or **permanent** fault codes, depending on selection, from the vehicle system ECU's that are selected in the **ECU's CONFIG** option. All of these functions will then produce a list of Faults and their definitions in plain text, that can be scrolled through one fault per screen.

The **read custom** option is provided for those who have read and understood the ISO 14229 standard and want to apply their own masking and filtering to limit the Fault Codes that are displayed to their masks specifications. The ECU's that will be read or not are still dictated by those selected in the **ECU's Config** section.

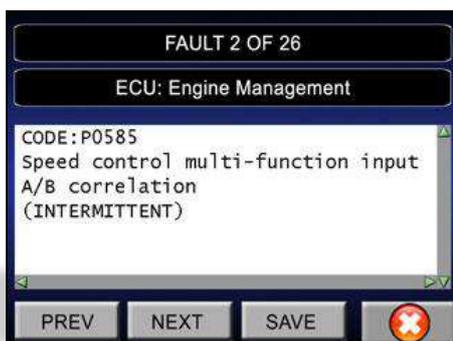


The **ECU's Config** sub-function provides a list of all of the vehicle system ECU's fitted to the currently connected vehicle. This allows for the selection and de-selection of any ECU that the first four fault reading functions will read the fault codes for.

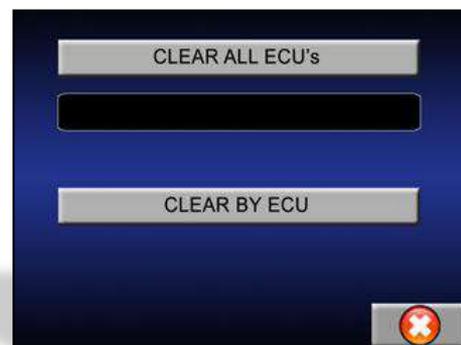
By touching the  next to the ECU listing, the box will change to a  indicating that the ECU has been selected. There is also the option to Select All  if you wish to read all ECU's in the vehicle or indeed clear all .

You will then need to exit this screen when all of the desired ECU's have been selected, by pressing the  located in the bottom right corner.

After selecting the Read Faults option, you will be presented with a screen showing the faults that have been read. If there is more than one fault displayed, it will show Fault "1 of X" (X being the total amount of faults found). You can scroll through to read the full list of faults. In the display, you will see the actual ECU where the fault has been detected, a short description of the fault code and its full official definition:



We have also included the ability to save the fault codes read to the SD card, which can then be viewed as a text file through any PC or laptop. This may be useful when seeking advice about fault codes through our forums for example.



The CLEAR function is used to clear the detected fault codes, but provides two options. The first is to clear Fault codes from all of the vehicle system ECU's that are selected in the ECUs CONFIG option, and the second allows the possibility to clear fault codes by individual listed ECU's.

## ECU Information (required for programming/flushing):

This diagnostic function produces a list of all the vehicle system ECU's fitted to the currently connected vehicle, which can then be individually selected. On selecting a system's ECU, the Nanocom Evolution will then read and display all of the information specific to that ECU, including VIN numbers, serial numbers, hardware numbers, software numbers, assembly numbers and other information. This information can be saved to a text file on an SD/SDHC card, if inserted, and can be used to select the correct set of files from the Flash File Database on the Genesis web site.

After the vehicle information has been read, you then need to have in mind which ECU you wish to program/flash with the Nanocom Evolution and then read the required information from that ECU.

By selecting "Read" next to the ECU name, this will then present the information related to that ECU. As an example, here is an ECU's information being displayed from a Discovery 3 (image below)



Using the scroll bar at the bottom, you can obtain all the information related to the ECU. The full list of available information can be as follows:

Hardware Number, Serial Number, Software Number, Calibration Data 2, VIN Number, Assembly Core Number, Assembly Part Number, Delivery Assembly Number, Software Number 2, Boot Software I.D, Active Network Configuration, Calibration Part No, Calibration Data 3, Software Number 3 and Legacy Assembly Number.

A screenshot of a diagnostic tool interface with a dark blue background. It displays three fields: 'HARDWARE NUMBER:' with the value 'YAH500210', 'SERIAL NUMBER:' with the value '0344534004000000', and 'SOFTWARE NUMBER:' with the value 'NNV505350'. At the bottom, there are three navigation buttons: a green left arrow, a green right arrow, and a red 'X' button.

Some of this information will need to be noted if you intend to flash/program the software on any ECU. You need to make a note of the Hardware number as this will be required for the next stage of the process.

## ECU Programming:

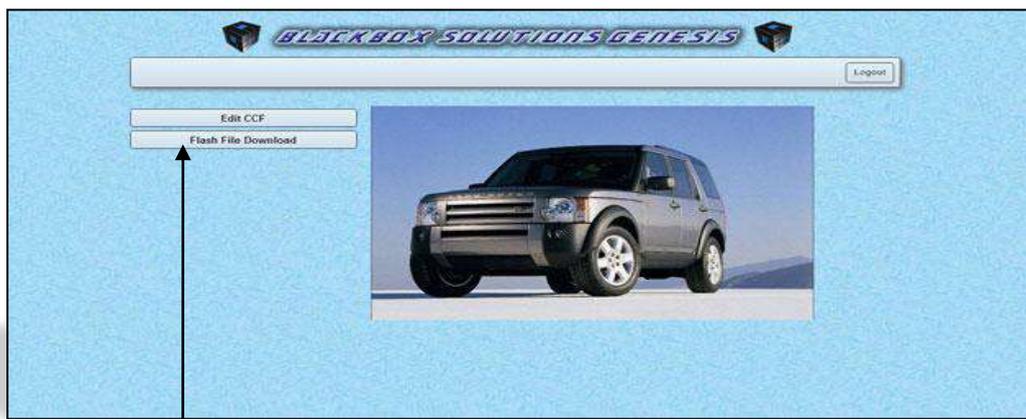
This diagnostic function provides the capability to flash any files that have been downloaded from the Genesis web site into its corresponding vehicle system ECU. This could be either a set of files to flash an ECU or a standard/modified CCF file, as the Genesis website provides both capabilities via its Flash File database and CCF Editor function.



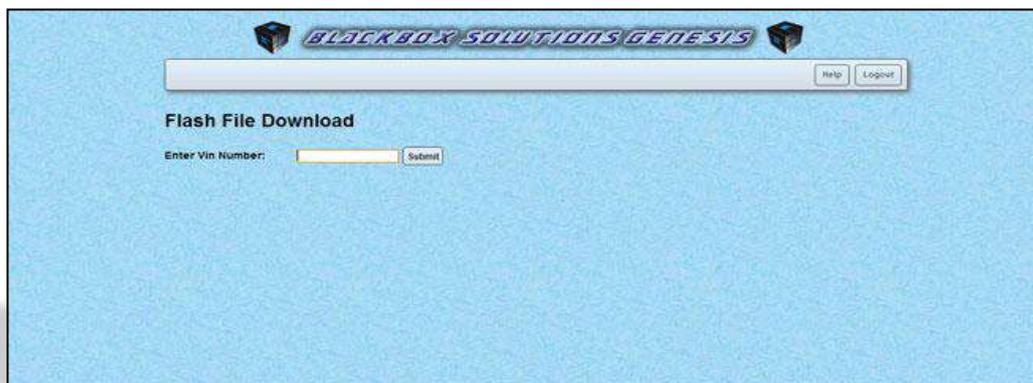
**IMPORTANT:** Your Nanocom site login details are the same for the Genesis website, which is located here: <http://vbf2.blackbox-solutions.com/FaultmateGenesis-Server/genesis.action>

## Flash File Download:

Welcome to the Genesis Website by Blackbox Solutions. This is a step by step guide to Downloading and using Flash Files for individual ECU's, this is done to enable certain features and to update software. Once you have logged in with your member details, you will be presented with this screen:



Click on this option and you will be presented with a screen to enter your VIN number:



**HINT:**

Locating your VIN: The VIN is stored in some ECU's, such as the Instrument pack, Body Control and ABS. It can also be obtained from the vehicle itself and can be found in various locations such on the passenger side lower corner of the Windscreen, or you can check your vehicles documents or handbook for further information.

Once the VIN has been entered, press **Submit** to be taken to the next screen where you will be presented with the vehicle model based on the VIN entered. A drop down box allows you to select the ECU that you intend to flash and require files for:

Flash File Download - Range Rover Sport 2005 to 2009

Enter Vin Number: SALL5AAG5AND021 Submit

Select ECU: Ride Level

Display Land Rover Part Numbers

Flash File Download - Range Rover Sport 2005 to 2009

Enter Vin Number: SALL5AAG5AND021 Submit

Select ECU: Ride Level

Assembly Number: Filter on Assembly

Hardware Number: Filter on Hardware

| Assembly      | Hardware       | Software                       |
|---------------|----------------|--------------------------------|
| AV02-3C696-AB | AV02-1AC201-AB | AV02-1AC100-AP, AV02-1AC100-AP |
| AV02-3C696-AC | AV02-1AC201-AB | AV02-1AC100-AP, AV02-1AC100-AP |
| AV02-3C696-AD | AV02-1AC201-AB | AV02-1AC100-AP, AV02-1AC100-AP |
| AV02-3C696-AE | AV02-1AC201-AB | AV02-1AC100-AP                 |
| AV02-3C696-AF | AV02-1AC201-AC | AV02-1AC100-AP                 |

In this example we are looking at a Range Rover Sport 2005 to 2009 Model and the ECU selected is the Ride Level Control Module (RLM). You now have a further two drop down boxes that can filter the information based on the Assembly number or Hardware number, which you will have taken from the Nanocom Evolution ECU information section for reference in this situation.

You will notice that to the right of the Select ECU dropdown box, there's an option that says **Display Land Rover Part Numbers**, If you click on this it will change the information listed in the main window, and the option will now read **Display Ford part Numbers**:

Flash File Download - Range Rover Sport 2005 to 2009

Enter Vin Number: SALL5AAG5AND021 Submit

Select ECU: Ride Level

Assembly Number: Filter on Assembly

Hardware Number: Filter on Hardware

Display Ford Part Numbers

| Assembly      | Hardware       | Software                       |
|---------------|----------------|--------------------------------|
| SH02-5A019-CA | SH02-14D092-AA | SH02-14D096-AA, SH02-14D094-CA |
| SH02-5A019-CB | SH02-14D092-AA | SH02-14D096-AA, SH02-14D094-CB |
| SH02-5A019-CC | SH02-14D092-AA | SH02-14D096-AA, SH02-14D094-CC |
| SH02-5A019-CD | SH02-14D092-AA | SH02-14D096-AA, SH02-14D094-CD |
| SH02-5A019-CE | SH02-14D092-AA | SH02-14D096-AA, SH02-14D094-CE |
| SH02-5A019-CA | SH02-14D092-AA | SH02-14D096-AA, SH02-14D094-AA |
| SH02-5A019-BA | SH02-14D092-AA | SH02-14D096-AA, SH02-14D094-BA |

Flash File Download - Range Rover Sport 2005 to 2009

Enter Vin Number: SALL5AAG5AND021 Submit

Select ECU: Ride Level

Assembly Number: Filter on Assembly

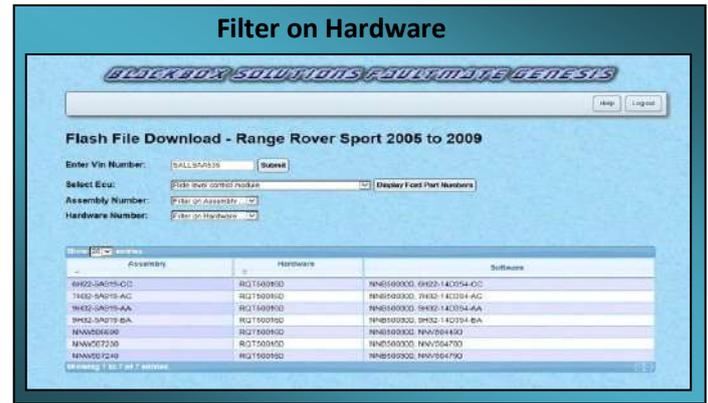
Hardware Number: Filter on Hardware

Display Ford Part Numbers

| Assembly      | Hardware   | Software                  |
|---------------|------------|---------------------------|
| SH02-5A019-CC | RQ21000100 | RNB000300, SH02-14D094-CC |
| SH02-5A019-AC | RQ21000100 | RNB000300, SH02-14D094-AC |
| SH02-5A019-AA | RQ21000100 | RNB000300, SH02-14D094-AA |
| SH02-5A019-BA | RQ21000100 | RNB000300, SH02-14D094-BA |
| RNB000300     | RQ21000100 | RNB000300, RNB000400      |
| RNB000300     | RQ21000100 | RNB000300, RNB000400      |
| RNB000300     | RQ21000100 | RNB000300, RNB000400      |

The reason for the dual numbering is that Land Rover have changed the way the part numbers were issued during its history of vehicle production, mainly due to changes in the company ownership, so you may need to change this option in order to help find the part number obtained from your ECU information page.

There are also two filter options that allow you to find the file more easily:



We have chosen the Ride Level Control Module and selected to view by **Assembly Number** for this example.

In this example, we have selected the Assembly number 9H32-5A919-BA, shown circled in red below. If you then double click anywhere on the files pale gray line to open it, you will receive the following information screen:

You will notice that not only do you have the Ford part number listed, but also its Land Rover alias (A.K.A.). This will aid in confirming the correct software to flash your desired ECU.



In each of the sections in the example above are also details regarding Successor and Predecessor software versions. These are simply the previous older and succeeding newer versions of the same software. This is useful for helping to narrow down the most recent files available. Note that more recent files may have features and functions that earlier software may not have, like the famous Discovery 3's "clock on Dash".

Once you have located the appropriate file, you need to click **Download** to be able to save the file to your laptop/PC.

**Please do take notice of the Disclaimer before proceeding, the information shown is important.**



Click **Accept** if you wish to continue and then the system will prompt you to **Save** or **Open** the file.



You now need to save the file to the PC and then extract the contents of the zipped file locally to your PC/Laptop, it is important to note that unzipping files directly to the SD card may leave them non-functional. Once that is done, you need to move/copy the files to the SD Card you will use with the Nanocom Evolution. This file can be stored either in a new folder of your own creation (maximum of 8 characters long), in the root of the SD card itself or in the folder already on the card called **BBS**.

Insert the SD card into the Nanocom before powering on the unit then go through the following menus, **CAN-BUS VEHICLE > ECU Programming**; after the Nanocom Evolution has done its vehicle detection process, you will have this screen:

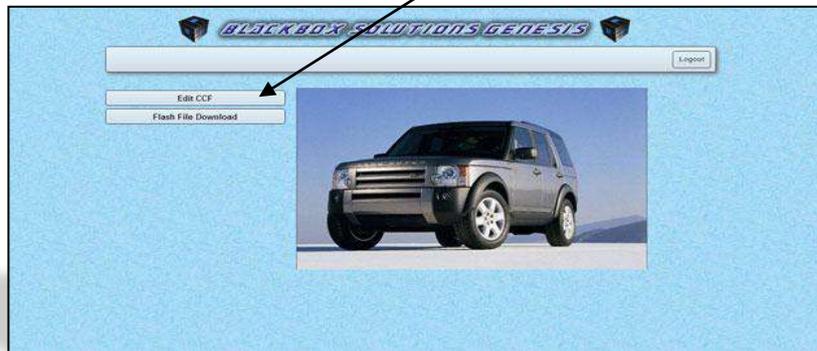


Click **Open File** and then from the files/folders displayed, navigate through and find the **"Info.enc"** file you have downloaded, select it and observe that it is now highlighted in yellow, and click **OK**. Now follow any on screen prompts until you find the **Start Flashing** button. Click **OK** to proceed and the file will be loaded. Follow any further on screen prompts.

## CCF (Car Configuration File) Editing:

As with the ECU programming, this function is used in conjunction with the Genesis online system and is only for CAN-BUS vehicles. Using your Nanocom-diagnostics login details, which is also your Genesis website login, provided you have purchased a CAN-BUS unlocked Nanocom Evolution, you will be presented with this screen:

Select the **Edit CCF** button



You are now presented with several options:



1. **Upload Nanocom File:** This would be a file already saved from a Nanocom session. It can be uploaded and edited as shown below and saved to be input using either a Nanocom or the SDD system.
2. **Upload IDS Session file:** A section for uploading any IDS or SDD session files.
3. **Upload "As-Is" from the Nanocom:** Allowing you to upload the CCF captured from your vehicle directly into the Genesis system for editing etc.
4. **Use "As-Is" history:** This function allows you to reference and re-use all of your previously uploaded "As-is" files, in case you'd like to reload a past CCF.
5. **Use a Copy of "As-Built" from Blackbox Solutions:** This uses the vehicles VIN to confirm the precise model and give you the factory standard file used at the time of the vehicles build from Land Rover.
6. **All Vehicles, As-Built Comparison:** This section of the site allows you to compare percentages of features and functions activated across all the As-Built files in our system.
7. **Back:** Takes you back to the main menu with **Edit CCF** or **Flash File Download** options.

**Important:** *If you have previously had your Car Configuration File (CCF) changed by another diagnostic system or the dealer's diagnostic tool to have features enabled, these changes will not be reflected in the as-built file. So, unless you change the settings to match any functions already enabled in your current CCF, this file would overwrite any previous changes as the 'As-built' file is the factory standard for your vehicle.*

So, based on a vehicle that has had no enhancements enabled, we will now show you how to enable 4x4 info screen on a Range Rover Sport 2005 to 2009 model:

Click on **Use a Copy of As-Built from Blackbox Solutions** and you will have the following screen open...

Enter your Vehicle VIN and click **Submit**...

Locating your VIN: *The VIN is stored in some ECU's, such as the Instrument pack, Body Control and ABS. It can also be obtained from the vehicle itself and can be found in various locations such on the passenger side lower corner of the Windscreen, or you can check your vehicles documents or handbook for further information.*

The system now displays the vehicle model and build year range (if applicable) at the top of the following screen, shown to the lower left:

**CCF Editor- Basic Mode**

| Description                         | Current Setting                   | As Built % |
|-------------------------------------|-----------------------------------|------------|
| Coil Springs                        | Not fitted / Disabled             | 100%       |
| Delivery Mode - Servostabil         | Not fitted / Disabled             | 100%       |
| Dynamic Response Module (DRM/DRM2)  | Not fitted / Disabled             | 5%         |
| Four Corner Air Suspension          | 4 corner air suspension is fitted | 100%       |
| Left or Right Hand Drive            | Right hand drive                  | 24%        |
| Model Year                          | 2005 model year                   | 4%         |
| Hiding Roof Ratchet                 | Not fitted / Disabled             | 31%        |
| Terrain Optimisation Fitted         | Terrain optimisation is fitted    | 100%       |
| Towing Ball Fittment Changer        | Not fitted / Disabled             | 91%        |
| Vehicle Annular                     | Non-annular vehicle               | 100%       |
| Vehicle Identification Number (VIN) | SALL6AAS15A922A                   |            |

**CCF Editor- Advanced Mode**

| Description  | Current Setting  | As Built % |
|--|--|------------|
| ACC Indication in Instrument Cluster                   | Disabled   | 100%       |
| Automatic Speed Limiter Display Type                   | Automatic: speed limit full display                                    | 100%       |
| Automatic Speed Limiting                               | Disabled   | 100%       |
| Battery Health Warning                                 | Disabled   | 100%       |
| Bitl Monitor   | Disabled   | 100%       |
| Brake Pad Wear Warning in Instrument Pack              | Disabled   | 100%       |
| Dash Board Display Type / Configuration                | Not fitted with road traffic information/display on the center console | 8%         |
| Direct Paracruise Filter Service Interval Announcement | Disabled   | 95%        |
| Distance Units   | Miles  | 40%        |
| Fuel Economy Units                                     | Miles/gallon (UK)  | 20%        |
| Caluk Type   | Imperial   | 100%       |
| Cruise Control   | Disabled   | 100%       |

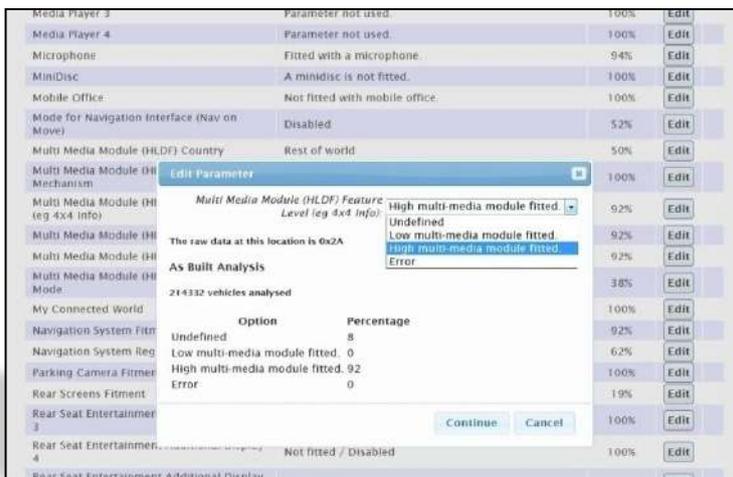
You can change from the Basic screen to the Advanced by selecting **Switch Editor Mode**. The Advanced mode as you can see from the Right hand screen is more complex and has more features and functions available to edit.

We now need to select the **Infotainment** tab which opens all options for this section. In the picture you will note that it shows a percentage of 'As-Built', this is in all sections. It shows us the percentage of models with CCF Files on record that have the 4x4 info feature enabled is currently 92% (circled in the image below to the right) within this vehicles models category. So, we can assume that this vehicle is one of the 8% without.



|  |   |      |      |
|--|---|------|------|
| Media Player 3                                       | Parameter not used.                                   | 100% | Edit |
| Media Player 4                                       | Parameter not used.                                   | 100% | Edit |
| Microphone   | Fitted with a microphone.                             | 94%  | Edit |
| MiniDisc   | A minidisc is not fitted.                             | 100% | Edit |
| Mobile Office  | Not fitted with mobile office.                        | 100% | Edit |
| Mode for Navigation Interface (Nav on Move)          | Disabled  | 52%  | Edit |
| Multi Media Module (HLD) Country                     | Rest of world   | 50%  | Edit |
| Multi Media Module (HLD) DVD Mechanism               | Horizontal DVD mechanism                              | 100% | Edit |
| Multi Media Module (HLD) Feature Level (eg 4x4 info) | High multi-media module fitted.                       | 92%  | Edit |
| Multi Media Module (HLD) Fitment                     | Undefined   | 92%  | Edit |
| Multi Media Module (HLD) Japan Spec                  | Multi-media module for non-japanese market is fitted. | 92%  | Edit |
| Multi Media Module (HLD) Manufacturer Mode           | DENSO mode  | 38%  | Edit |
| My Connected World                                   | Parameter not used.                                   | 100% | Edit |
| Navigation System Fitment                            | Navigation is fitted.                                 | 92%  | Edit |
| Navigation System Region                             | Europe  | 62%  | Edit |
| Parking Camera Fitment                               | No parking camera fitted.                             | 100% | Edit |
| Rear Screens Fitment                                 | No  | 19%  | Edit |
| Rear Seat Entertainment Additional Display 3         | Not fitted / Disabled                                 | 100% | Edit |
| Rear Seat Entertainment Additional Display 4         | Not fitted / Disabled                                 | 100% | Edit |
| Rear Seat Entertainment Additional Display 5         | Not fitted / Disabled                                 | 100% | Edit |
| Rear Seat Entertainment (DVD) Audio                  | Not fitted / Disabled                                 | 100% | Edit |

Click **Edit** in the final column and you will see this window appear...

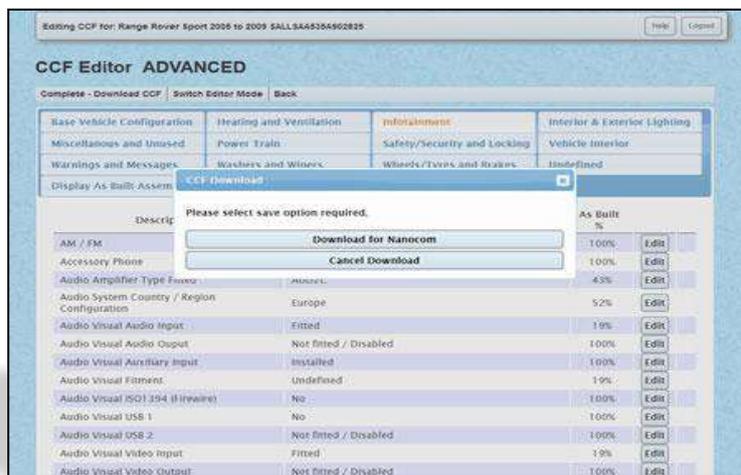


Using the drop down menu, you should change the selection from **Undefined** to **High multi-media module fitted** and then click **Continue**:

|  |   |      |      |
|--|---|------|------|
| Media Player 3                                       | Parameter not used.                                   | 100% | Edit |
| Media Player 4                                       | Parameter not used.                                   | 100% | Edit |
| Microphone   | Fitted with a microphone.                             | 94%  | Edit |
| MiniDisc   | A minidisc is not fitted.                             | 100% | Edit |
| Mobile Office  | Not fitted with mobile office.                        | 100% | Edit |
| Mode for Navigation Interface (Nav on Move)          | Disabled  | 52%  | Edit |
| Multi Media Module (HLD) Country                     | Rest of world   | 50%  | Edit |
| Multi Media Module (HLD) DVD Mechanism               | Horizontal DVD mechanism.                             | 100% | Edit |
| Multi Media Module (HLD) Feature Level (eg 4x4 info) | High multi-media module fitted.                       | 92%  | Edit |
| Multi Media Module (HLD) Fitment                     | Undefined   | 92%  | Edit |
| Multi Media Module (HLD) Japan Spec                  | Multi-media module for non-japanese market is fitted. | 92%  | Edit |
| Multi Media Module (HLD) Manufacturer Mode           | DENSO mode  | 38%  | Edit |
| My Connected World                                   | Parameter not used.                                   | 100% | Edit |
| Navigation System Fitment                            | Navigation is fitted.                                 | 92%  | Edit |
| Navigation System Region                             | Europe  | 62%  | Edit |
| Parking Camera Fitment                               | No parking camera fitted.                             | 100% | Edit |
| Rear Screens Fitment                                 | No  | 19%  | Edit |
| Rear Seat Entertainment Additional Display 3         | Not fitted / Disabled                                 | 100% | Edit |
| Rear Seat Entertainment Additional Display 4         | Not fitted / Disabled                                 | 100% | Edit |

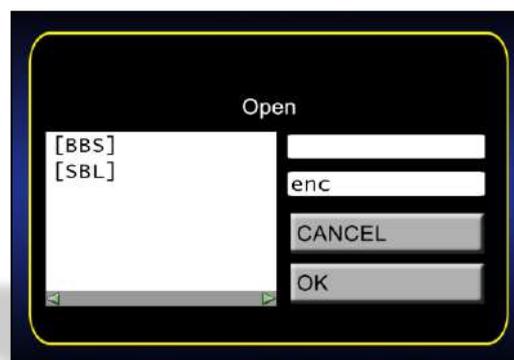
The change is now highlighted in Red and you have the option to **Undo** the change before saving should it be necessary.

Click the **Complete – Download CCF** button. Then select **Download for Nanocom**.



You now need to save the file to your PC/Laptop and then extract the zipped file also onto your hard Drive. Once unzipped, copy the file/s onto an SD-Card to insert into the Nanocom Evolution.

Insert the SD card into the Nanocom Evolution before powering on the unit and then go through the following menus, **CAN-BUS VEHICLE > ECU Programming**. After the Nanocom Evolution has completed its vehicle detection process, you will see the left image on screen:



Click **Open File** and then, from the File window (right image), navigate through the folders or files and find your recently added "Info.enc" file and click to select it. Follow any on screen options, prompts and please be mindful to read any warning or error messages properly. At the final screen, you will confirm the process by pressing **Start Flashing**.

## CAN BUS Functions-Continued:

### SERVICE FUNCTIONS:

This diagnostic function provides the ability to reset the Service interval announcer/reminder where applicable and covers both the annual and bi-annual services to the European standards for the 29-bit CAN Network vehicles, which is all vehicles from 2005 to 2009/10.

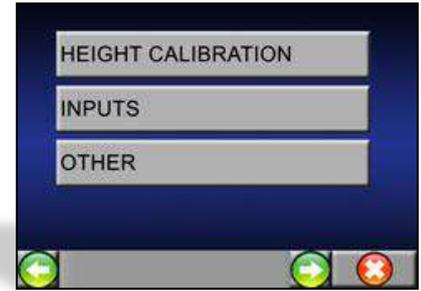
For the 11-bit vehicles, 2010 onwards, this function will contain a single button that covers the annual service reset only and conforms to all international specifications for service light resetting.



## AIR SUSPENSION (EAS):

The diagnostic functions provided under this section are identical for all CAN-BUS based Land/Range Rover Vehicles with Electronic Air Suspension. There are three sections currently available (V1.24 onwards and shown in the image).

These functions are explained in detail in the following sections.



### HEIGHT CALIBRATION:

This function provides the ability to manually increase or decrease the current height *calibration* values of the vehicles Electronic Air Suspension. Press on the birds eye view image of the vehicle and you will be taken to the height calibration section (shown in the lower right image).

This section incorporates the current “*Actual*” calibration value for each corner of the vehicle and all of the individual corresponding “*Target*” value fields where the user can enter their intended values, one pair of each field for each wheel of the vehicle.

Upon entering this section, you will be presented with the current height calibration values being read and displayed, which can then be changed by pressing either the + or – increment buttons, which shift the value in increments of 5. You can also manually enter new figures using the on-screen keyboard, which appears when you press on any of the white “*target*” fields, allowing you to set individual values to each corner.



### How to use the height calibration function:

The height calibration function is designed to communicate values in the same fashion as the ECU that controls the Air Suspension. There is a range governed by the ECU of actionable values, this range is from (negative) -50 to 50, attempting to write values outside of this range will prompt an error message from the ECU and the values will not be written. However, if you have, for example, three of the corner values at 43 and the remaining one at 48, pressing the + increment button once would add 5 to all values, three of the corners will now show 48 and the remaining would be 53. If you then press **write**, the three values of 48 will be written but, you will receive an error message stating that the value for the corner at 53 is *out of limits* and will remain unchanged.

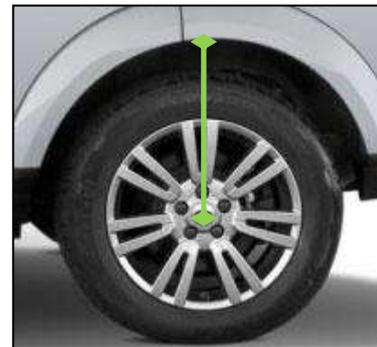
The values that you would see for the first time when using the Calibration function are the *current off-set* values the vehicle has stored in it's memory. These values are used to keep the ride level even in all height modes, which are *off-set* against variables such as a single/multiple height sensors being fitted or replaced since the vehicles construction, general vehicle use, age factor and faulty sensors to name a few.

The structure of the values are as follows, each single point of value in the 100-wide range available represent 5mm, so a value of 2 will give roughly 1 centimeter of height offset. Bearing in mind that the function is solely affecting the off-set calibration, not the actual height of the vehicle directly, although of course, the calibrations have an effect on the actual heights and you will see the vehicle physically adjusting heights while using this function.

It is very important to note, that as being an off-set, the values are reversed in their affect, so to physically **raise** the vehicle by means of off-set calibration, you must **lower** the value itself. For example, if you wish to **raise** the height of your vehicle by 3cm, you will need to **lower** the calibration value by 6 points, equally on all 4 corners.

When attempting to alter the calibration of a single corner, it will have a knock-on effect on the other three corners as the vehicle is physically a flat platform that is only supported by its own four wheels, changing the height of one corner will effect the rest of the vehicles height. It is advisable to roughly calculate some small changes in values for the other three corners in contrast to any single large change for one corner.

To achieve the best results when using this application, use a traditional tape measure or other similar measuring device and take measurements as shown in the picture to the right, from wheel centre, vertically to the highest inner edge point of the wheel arch, as shown opposite →



**IMPORTANT:** *Make a written note of these 4 measurements as well as the 4 calibration off-set values displayed by the Nanocom upon first entering the application and store them in a safe place, you may need them at a later date!*

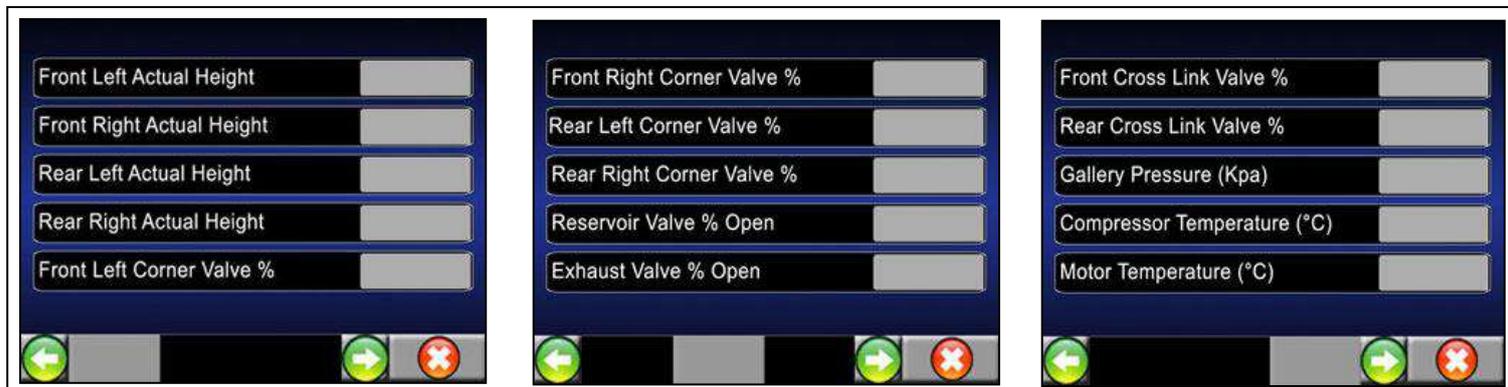
Each off-set value, as previously stated, can be affected in increments of 5 using the + and - buttons, be sure to calculate the actual heights of each wheel in millimteres against the level of adjustment you wish to make. You should now be able to adjust to how much height off-set you'd like, which will remain a constant across all of the different height modes, in effect, setting the calibration off-set to make the vehicle 5cm lower, will do the same in all height modes (unless reaching that height is beyond the capabilities of the Air Suspension travel length).



**IMPORTANT:** *It is advisable to use the "End EAS Enable" function, from the "other" section after making any calibration changes or using any of the "other" functions.*

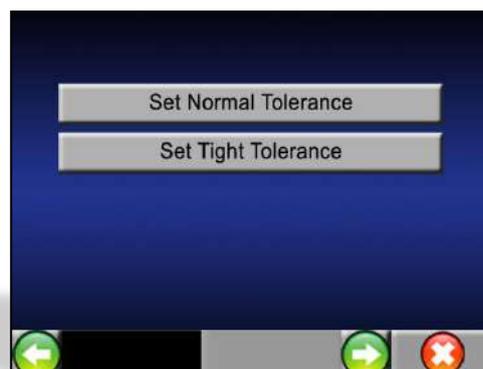
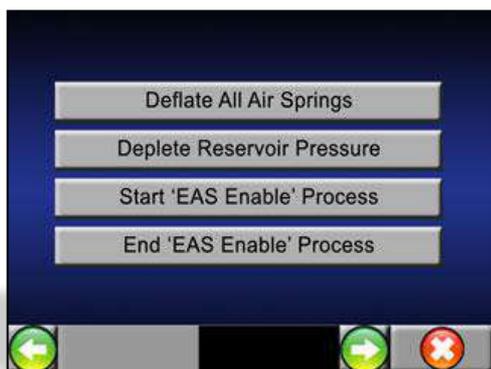
## EAS INPUTS:

This sub-function displays live data from various inputs for the EAS system, they display in real time across three pages...



This function is extremely useful in all aspects of dianostics. For example, being able to monitor individual corner height valve activity while attempting to diagnose a fault in the EAS or to perhaps monitor the condition and functionality of the compressor, the reservoir and the motor can lead to finding the cause of malfunctions quickly.

## EAS "OTHER" functions:



- **Deflate all air springs:** This function is used to expel the air pressure in all four suspension springs into the surrounding atmosphere. Use of this function will lower the vehicle to the lowest limits of suspension travel and will enter the vehicle into "manufacturer mode".
- **Deplete reservoir pressure:** This function performs a complete pressure depletion of the air reservoir by opening its exhaust valve, again this expels the air into the surrounding environment. After the process is complete, the internal reservoir pressure should match that of the atmospheric pressure outside the vehicle.
- **Start EAS Enable and End EAS Enable:** The EAS enable is a calibration mode that allows the ECU to fully accept changes in calibration and settings. It is advisable, although not necessary, that before performing any changes to the EAS, that the "Start EAS enable mode" is activated and then subsequently ended after any calibrations or changes in EAS settings. Ending the EAS enable will return the vehicle to "normal" mode. The second advisable use for the "End EAS enable mode" is after flashing or editing the EAS, or any other related ECU that works in direct conjunction with the air suspension, such as the Transfer Case Control Module, that this function is used to return the air suspension back to "normal" mode.
- **Set tight/normal Tolerance:** The tight tolerance mode is used primarily for wheel alignment/tracking and may also be used in some cases for calibrating the Adaptive Front Lighting system. This mode is not to be used as part of the Air Suspension Calibration process.

## PARK BRAKE:

- **Longitudinal accelerometer calibration:** This function is used to recalibrate the accelerometer, the vehicle performs this function independently, however, you must make sure that the vehicle is on a level surface and that it remains stationary throughout the whole procedure. Make sure the parking brake module is correctly secured to the vehicle and that the parking brake is applied.
- **Drive to mounting position:** the following operation will drive the parking brakes to the mounting position, allowing the brake cables to be connected to the brakes. This may be necessary if the park brake is operated without the cables being connected to the brakes. This can lead to a condition where not enough cable is available to connect the brakes.
- **Drive to latching position:** This function will drive the Park Brake to the latching position, which might be necessary if the 'park brake emergency manual release' has been used.
- **Unjam:** This will drive the Park Brake to be un-jammed by first driving it into the release position and then into the mounted position. The engine must be running at idle speed. After completing this procedure, check the condition of the rear brake shoes and drums as well as the brake cables, to be sure they are correctly attached.

## ADAPTIVE RESET:

The adaptive reset function gives the user the ability to reset any adaptive values stored by any and all ECU's that store them. For example, the Gearbox and Transfer Case Control Module both store constantly changing values such as the mileage driven in High and Low ranges as well as mileage covered in each individual gear. A particular purpose of this could be to restart a mileage count for a certain ECU as part of diagnosing a fault.

## CCF Read:

This function can be used by those who cannot locate their "As-built CCF" from our Genesis website because their VIN number may not be recognised at first. This allows the user to take a copy of the CCF "As is" that is currently on the vehicle and save it to the SD card. The file can then be uploaded through a PC/Laptop to the Genesis website, where it can then be edited to the users' specifications.

*Here is a step by step on how to use this function:*

- Plug the Nanocom, with an SD card inserted, into the vehicle
- Go to the CAN-BUS section of the menu and select the **read CCF** function.
- Once VIN detection has completed, you can select **read and save**
- Enter a name for the CCF file and press **ok**
- Once saved, power down the Nanocom and remove the SD card
- Put SD card into a PC or Laptop and save the CCF file somewhere accessible
- Login to Genesis, select **edit CCF**, from the next page select **Upload As-is from Nanocom**
- Use the **browse** button to locate the CCF file from your PC/Laptop
- Once located, press the **upload** button, this will load the CCF and automatically take you to the CCF editor section of the site.
- From here, you can edit your CCF with basic or advanced editor modes
- Once editing is complete, press the **complete-download CCF** button in the top left
- Save the file to your PC or Laptop, then place that file back on the SD card.
- Insert the SD card into the Nanocom and connect it to the vehicle
- Enter the CAN-BUS menu and enter **ECU programming**
- The Nanocom will ask you to **open file**, press this and on the following screen, select the new CCF file and press **ok**
- Follow all on screen prompts and this will load the CCF to the vehicle.

## CAN Instrument mode:

The Instrument mode function is designed to display live "on the move" data (inputs) which are taken from the engine management ECU. At present (V1.24), there are two pages of 6 useful and informative inputs for each of the CAN-BUS vehicles, such as engine oil temperature and RPM. More individual pages of different inputs are currently being developed for the CAN-BUS vehicles and they will be added to future releases, as well as the "peak detection" function from the Legacy Systems.

The legacy vehicles have multiple pages for each of model as well. This function can be used in conjunction with the dash/window mount kit (NCOM30) for the Nanocom, allowing the user to observe live data while driving the vehicle safely and hands-free.



## Clutch Calibration (Transfer Case Control Module):

This function is to calibrate the Transfer Case Control Clutch (TCCM) for any occasion after the user may have flashed the Transfer Case Control Module. The function is completely self sufficient and does not require any additional actions on behalf of the user.

## CCF (Car Configuration File) Sync:

This function is used after flashing the Body Control Module, the BCM. It will re-sync the BCM with the Instrument Pack. It does this by reading the data from the Instrument Pack and re-writing it to the Body Control Module. This can also be used when recovering a 'downed' BCM.

## Puma 2.2 Inputs:

This section is a live data inputs function provided for the recently produced Land Rover Defender with the 2.2 Liter 4 Cylinder ZSD-422 Ford Duratorq Diesel Engine.

The section contains several groups of engine related inputs taken directly from various sources around the vehicle that are already being sent to the Engine Management system. The sections are available as follows:

1. Pedals and Positions
2. Engine components and Status
3. Engine Sensors and Lamps
4. Turbo and Boost
5. EGR (Exhaust gas recirculation) and DPF (Diesel particulate filter)
6. Fuelling
7. Air and Manifold

With a combined total of 50 live data inputs available, this facility is excellent for diagnosing engine or related running faults while on the move.

## VIN Tool:

This tool contains two specific functions, the VIN Check and Clear Cache. The Nanocom Evolution performs a VIN Detect whenever it is plugged into a CAN-BUS Vehicle. Upon doing this VIN Detect, the Nanocom will store the full list of detected ECU's on the vehicle and attach it to a memory of the VIN Number.

Given that sometimes an error can occur with the Nanocom or the vehicle, such as allowing the VIN Detect to operate while plugged into a car that does not have its ignition turned on. This can then log the VIN Number as having no ECU's present and will possibly prompt an error, even when plugging the Nanocom in a second time and allowing the VIN Detect to function with the ignition on. These tools are designed to help overcome these issues and similar ones.

**The purpose of these functions are as follows: VIN Check:** This function will perform a full VIN check, by asking for the VIN number stored in multiple ECU's on the vehicle and displaying them accordingly. This tool can be used to confirm that upto six ECU's on the vehicle all have the same VIN numbers programmed to them, assisting in

overcoming mismatched VIN numbers when a vehicle has a new ECU fitted/swapped for example, which is not being recognised by Nanocom applications such as the ECU Information section or causing an issue with recognising license codes etc.

**Clear Cache:** This function will clear the memory cache of any VIN Numbers stored and the lists of ECU's for each one, effectively allowing the Nanocom to run a full VIN Detect the next time a CAN-BUS car is plugged in, so it can recompile the list of ECU's on the vehicle and store them accordingly.

### **Steering Angle Sensor Calibration Application:**

This specialist function is to calibrate the steering angle sensor found as standard on all CAN-BUS Land and Range Rovers. The application is presented the same for both the 29-Bit and 11-Bit vehicles but please note, it is not available on either of the CAN-BUS Defender Puma model vehicles.

This application will be drawn into the dynamic menu for the following CAN-BUS vehicles:

- 2005-09 Discovery 3 and Range Rover Sport
- 2010+ Discovery 4 and Range Rover Sport
- 2010+ Range Rover L322

The Function is a single button press application and requires the vehicle to only be stationary, with the steering wheel as perfectly centered as possible. To assist the user in calibrating the steering wheel angle sensor, we have included some live data inputs from the steering wheel sensor, they are:

- Steering wheel angle- displayed as 3 digits with 2 decimal points, such as 255.20.
- Steering wheel calibration status: Which can display Initial, Fault or Calibrated.

### **Fuel Pump Lift: (Diesel vehicles only)**

The fuel pump application is available only on diesel vehicles and is designed to command the Fuel Lift Pump to extend to it's maximum stroke. This action is performed as a standard command and lasts for a single "pulse" of the lift pump. It can be repeated as needed.

This application is a single button press application and completes automatically. The intended purpose of this can be to purge the fuel system for refit or repairing purposes, to test for faults in the fuel delivery system or to test the functionality of a fuel lift pump itself.

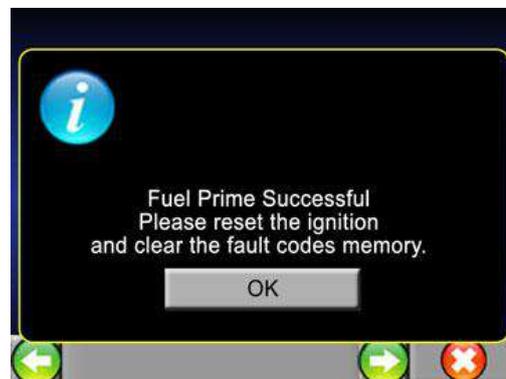
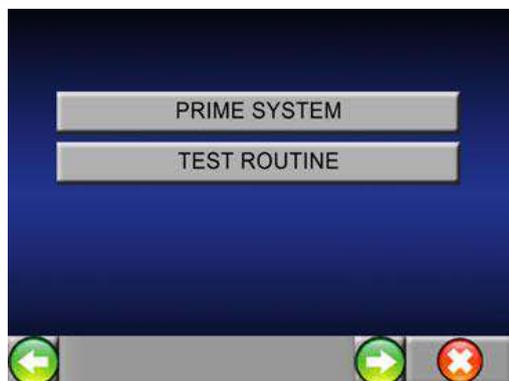
### **Fuel Burning Heater:**

The Fuel burning heater is a system of various component fitted to provide auxiliary heating of the engine coolant during cold weather. This is largely to aid emissions and to speed up cabin warm up. Notably those vehicle sold from new in warm climates are not equipped with this system. The function of the heater is to assist the vehicle to warm up on cold starts, by burning fuel to directly heat the coolant in the engine. One problem with modern vehicles is

that they are so efficient that they don't produce enough heat to warm the coolant enough to ensure efficient running.

There are few steps to be followed in order to successfully use the FBH functions:

1. When running the "Prime System" the ignition should be in stage II.
2. When running the "Test Routine" the engine must be running.
3. Always clear the faults prior to and after the test.



### Transit Mode or Transport Mode (Freelander 2):

The transit mode feature is to minimise battery usage when the vehicle is being stored or transported prior to sale. When the CCU is programmed in the transit mode, the following functions are disabled:

1. RF receiver
2. Tail door actuator
3. Tail door window
4. Central Door Locking (CDL)
5. Interior lamps

If the ignition is switched to position II, the CCU buzzer will sound an alarm to warn that the vehicle is in transit mode. The Nanocom Evolution can remove the transit mode feature and program the CCU to the market specifications.

### Trip Computer (Freelander 2):

The computer memory stores data for a journey, or a series of journeys, until it is reset to zero. The displayed information is for guidance only, as it can be affected by traffic, road and weather conditions. There are 3 trip memories available, A, B and Auto. The viewable trip memory can be selected through the Instrument panel menu. The trip computer function allows the user to change the fuel consumption display for the vehicle.

For the Freelander 2, there are 3 options available:

1. Set to liters/kms
2. Set to UK mpg
3. Set to US mpg

## Rear Differential on demand self test

The "Rear Differential on demand self test" is available for all Can-Bus vehicles except the Freelander 2. The demand self test on execution will cause the associated control module to run a pre-defined test which will cause any associated trouble codes to be logged if present. On some vehicles the rear differential motor can be heard when performing the test.

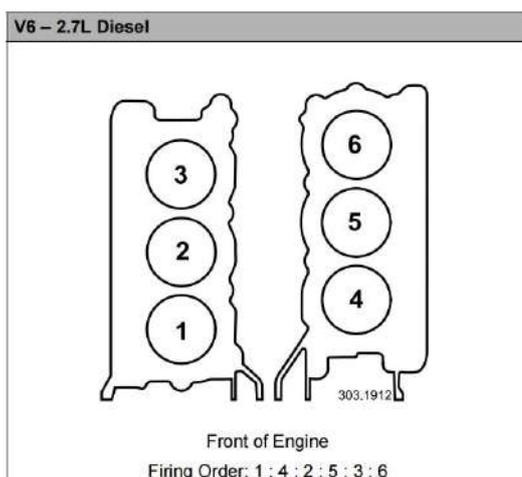
## ABS Bleed

The ABS Bleed function is available for all Can-Bus vehicles except the Freelander 2. The "ABS Bleed" function will power bleed the ABS hydraulic system for each of the four corners. The user needs to open the bleed nipple, run the function which pumps the pedal until all air is expelled. Once there is no air left in the system, the user needs to close the nipple and end the running function.

## Water in Fuel reset

The "Water in Fuel reset" is available for the Discovery 4 and Range Rover Sport 2010+ models. The water in fuel warning appears when the fuel filter water trap sensor (which is screwed in the bottom of the fuel filter) detects water. This routine will reset the water in fuel detection warning.

## Injector Cylinder Balancing for the Discovery 3 & RR Sport 05-09 2.7 Diesel



The cylinder balancing function will indicate if there is an issue with a particular injector or cylinder. A diagnostic message will be logged if 1 of the values (or all but 1) reaches a certain limit. The problematic cylinder is the one whose value is either much higher or lower than the others, bearing in mind that they will always have a small amount of variation.

If an injector has been replaced these values will re-adapt in a few seconds with the engine idling, if they do not, this indicates a compression problem with the cylinder. Only one injector can be detected to have an error at a time, so if 2 were faulty, the second would show up after the first had been rectified. The values are read back from the control module are multiplied by 1000. Cylinders 1 to 3

are known as Bank A and 4 to 6 are known as Bank B.

The minimum and maximum limits are around 400 and 1600 respectively. The optimal values are around 900. Most of the time if the ECU detects an issue with a cylinder or injector, it will increase/decrease the value for the next injectors to compensate for the imbalance.

Based on the cylinder firing order, the injectors are numbered as follows:

Injector 1 - Cylinder 1  
 Injector 2 - Cylinder 4  
 Injector 3 - Cylinder 2  
 Injector 4 - Cylinder 5  
 Injector 5 - Cylinder 3  
 Injector 6 - Cylinder 6

### **Battery Reset for Discovery 4, RR Sport 2010+ & Freelander 2**

This function will reset the values stored in the vehicle monitoring system. This function must be run only after a brand new battery has been fitted otherwise the monitoring system will log wrong data.

### **Adaptive Cruise Control Calibration for Discovery 4 & RR Sport 2010+**

This function needs to be performed only on brand new Adaptive Cruise Controls modules. It is not required to be performed if the Adaptive Cruise Control module has been previously used on another vehicle. If the Adaptive Cruise Control is brand new then please follow the below steps:

**Before running the function:** Make sure the vehicle is on level ground and that the forward looking sensor (front distance range sensor) levelling procedure has been carried out as detailed in the Workshop manual. This application should not be carried out until the forward looking sensor (front distance range sensor) is known to be correctly levelled.

**After running the function:** Make sure that the 'follow symbol' on the instrument pack is now flashing. The 'follow symbol' should now be flashing, this indicates that the vehicle is in 'service alignment' and now requires a driving cycle. The service alignment process measures the path of stationary targets such as street lights, railings, traffic signs, parked vehicles etc, and uses this data to correct for radar misalignment. Alignment will complete more quickly when more suitable targets are seen. The following recommendations will help: - The speed must be above 30mph (50kph). - Choose a road with plenty of metallic items to the sides. - Following vehicles too closely will obscure the stationary targets from the radar, so leave a time gap of at least 2 seconds. - A straighter road will produce a quicker and better result, although the process will still operate on curved roads. The time the module takes to align will vary, depending on the route, speed, number of targets, and individual module. When the flashing 'follow symbol' lamp extinguishes, the system is correctly aligned.

To be fully functional the following still needs to be carried out:

- Stop the vehicle at the next available opportunity.
- Turn the ignition off and wait 15 seconds.
- Start the engine, once 15 seconds have elapsed.

### **Windows Calibration for Discovery 4 & RR Sport 2010+**

This allows the calibration of the "one touch up and down" and of the "pinch protection" functions. Make sure the driver's door and window are closed prior to running these calibration sequences.

## Key Learning for Discovery 4 & RR Sport 2010+

For security reasons, although the nanocom is not VIN locked, we have introduced these key learning functions in a responsible manner and have ensured that none of them are accessible on a Nanocom unless the vehicle has previously been detected with the Ignition on, meaning that there must be or have been an existing key present at some point. In order to run any of the following functions, the ignition must be off.

When the vehicle is fitted with an older version of the Keyless module the process is straight forward, all instructions and prompts will be displayed on the Nanocom.

For the newer Keyless Modules the Nanocom will prompt you with some extra messages dependant on the need for two files to be flashed to the Keyless Module prior starting the key learning procedure. Please note that the information below will only apply to the newer Keyless Modules and are needed only when the Nanocom will display one or both of the following messages:

Please ensure that you downloaded and flashed the "CA" firmware file to the vehicle, refer to the manual for more information.

Please ensure that you downloaded and flashed the "LA" software file to the vehicle, refer to the manual for more information.

**The "CA" represents the Keyless Module Firmware required to enable the key learning session while the "LA" represents a secondary file required to program a new key.** If your Keyless Module already has the "CA" firmware then the Nanocom will ask only for the "LA" file. In case that your Keyless Module has a different version than the "CA" firmware then it will ask for both "CA" and "LA" in sequence.

If you have 2 extra new keys that must be learned to the same vehicle then the "LA" file must be flashed twice between the two key learning procedures.

The following steps show how to proceed and what is required in order to find the flash files for the correct software regarding the newer BJ32 and DPLA hardware types and how to successfully learn a new key on the newer Keyless Modules:

**Step no. 1:** Go to the "ECU INFORMATION" function and get the "ASSEMBLY CORE NO." which should be one of the following:

DPLA-14C250-AA

DPLA-14C250-BA

BJ32-14C250-AC

BJ32-14C250-BC

**Step no. 2:** Login to GENESIS using your account details: [www.nanocom-diagnostics.com/genesis](http://www.nanocom-diagnostics.com/genesis) and download and copy the relevant flash files based on the following details on the BBS folder of the SD Card (see step 3.):

\* **The "CA" firmware** (if needed Nanocom will prompt this in a message):

a) Find the corresponding group of ASSEMBLY CORE NO. from the Hardware row.

b) Each item in the group has four Software items. Download the one which the last item ends with "DPLA-14C104-CA"

**For DPLA-14C250-AA you need to download:**

AH32-19G481-CF \* PLA-14C250-AA \*AH32-14C105-AL, CPLA-14C107-AA, CPLA-14C430-AC, DPLA-14C104-CA

**For DPLA-14C250-BA you need to download:**

AH32-19G481-DF \* DPLA-14C250-BA \*AH32-14C105-AL, CPLA-14C107-AA, CPLA-14C430-AC, DPLA-14C104-CA

**For BJ32-14C250-AC you need to download:**

AH32-19G481-EF \* BJ32-14C250-AC \* AH32-14C105-AL, AH42-14C107-AB, CPLA-14C430-AC, DPLA-14C104-CA

**For BJ32-14C250-BC you need to download:**

AH32-19G481-FF \* BJ32-14C250-BC \* AH32-14C105-AL, AH42-14C107-AB, CPLA-14C430-AC, DPLA-14C104-CA

\* **The "LA" Secondary file**, if you have the newer BJ32 or DPLA hardware and the "CA" firmware new loaded this is needed for every new key that is to be learned:

a) Find the corresponding group of ASSEMBLY CORE NO. from the Hardware row.

b) Each item in the group has two Software items. Download the one which the last item ends with "DPLA-14C104-LA"

**For DPLA-14C250-AA you need to download:**

DPLA-19G481-JE \* DPLA-14C250-AA \*CPLA-14C107-AA, DPLA-14C104-LA

**For DPLA-14C250-BA you need to download:**

DPLA-19G481-KE \*DPLA-14C250-BA \* CPLA-14C107-AA, DPLA-14C104-LA

**For BJ32-14C250-AC you need to download:**

BJ32-19G481-LE \* BJ32-14C250-AC \* AH42-14C107-AB, DPLA-14C104-LA

**For BJ32-14C250-BC you need to download:**

BJ32-19G481-ME \* BJ32-14C250-BC \* AH42-14C107-AB, DPLA-14C104-LA

**Step no. 3:** Now that we have located and downloaded the required flash files these will need to be transferred on a SD Card specially prepared with the last SD Card App or Files, in the folder BBS. Once we have these files on the card we can proceed with the key learning task. The "SD Card App" and "SD Card Files" can be found on the restricted area at the link: <http://www.nanocom-diagnostics.com/restricted> where you are required to login with your account details. The instructions on how to prepare the SD Card can be found on the documentation section at the following link: <http://www.nanocom-diagnostics.com/support> under the name: "[SD Card Formatting](#)".

**Step no. 4:** Start the Key Learning sequence from the Nanocom menu. If prompted to flash the "CA" firmware, then exit the Key Learning menu and proceed with this from the Flash Programming menu using the "CA" flash file freshly downloaded from Genesis. Once successfully flashed please return to the Key Learning menu and repeat the procedure. For more information on how to flash files to various ECU's please refer to the documentation section <http://www.nanocom-diagnostics.com/support> for the flashing guide named "[ECU Flashing Guide](#)" and the video guide named "[Flashing an ECU - 4X4 info](#)".

**Step no. 5:** If the Nanocom does not prompt any message regarding the "CA" firmware and skips to the "LA" firmware message then exit the Key Learning menu and proceed with this from the "Flash Programming" menu using the "LA" flash file downloaded from Genesis. Once successfully flashed please return to the Key Learning menu and repeat the procedure.

**Step no. 6:** At this stage, after the successful flashing of the "CA" and /or "LA" files, the Nanocom will not require any other files and you will need to follow the simple tasks displayed on screen. Once the new key has been successfully learned to the vehicle the Nanocom will display a confirmation message.

## Key Learning Application Functions:

### Function no.1: Read Key(s) Status

This function shows the number of keys that are currently learned to the Keyless Vehicle Module (KVM) and the number of those keys currently present, for which you will need to place all available keys inside the vehicle. The number of non present keys can be deduced by deducting the number of "present keys" from the "number of programmed keys".

### Function no.2: Add a new key

This function exclusively learns a brand new key to the Keyless Vehicle Module (KVM) adding it to those already learned. It cannot learn previously learned or used keys.

## Additional support information and links:

At Blackbox Solutions, we strive to provide as much documentation about our products as possible, as well as member support forums and video demonstrations for all of our diagnostic equipment.

There is a documentation section available here:

<http://www.nanocom-diagnostics.com/support>

This page hosts a vast number of support documents from individual ECU guides to Nanocom Firmware upgrade guides through to complete Nanocom user guides.

Also, we have the Nanocom Support Forum which can be registered for here:

<http://nanocom.blackbox-solutions.com/index.php/contact-us/forum-membership-form>

The forum contains a huge amount of accumulated knowledge, hints and tips. Aswell as the constant and powerful support offered by other Nanocom owners and of course, the full BBS support team. This is our most powerful support tool.

You can also find many useful Tutorial and Demonstration Videos on our YouTube Channel, found here:

<https://www.youtube.com/user/BBSP38/featured>

We hope you enjoy your Nanocom Evolution!!!

V.1.30.