

# THE FAULTMATE SV VEHICLE DIAGNOSTIC SYSTEM

Unquestionably the most innovative concept in  
PC based vehicle diagnostic technology ever produced.



## SYSTEM OVERVIEW

V4.0

**FAULTMATE**

By

**BLACKBOX  
SOLUTIONS LTD**

## **On Board Diagnostic Technology.**

When computerized systems for cars were first developed, vehicle manufacturers were reluctant to purchase and fit them to their vehicles. This was mainly because they realized that the average dealership mechanic would have some difficulty repairing them. To overcome this problem, the designers of these vehicle systems built a quite sophisticated self test and diagnostic capability (On Board Diagnostics) right into the Main Electronic Control Units (ECU's). Any problem that was detected by these self diagnostics was indicated by the ECU flashing a lamp in a sequence that could be interpreted by anyone using a simple lookup table.

Since those early days, the number and complexity of computerized systems on Vehicles has evolved to a point where a vehicle is now little more than one enormous interactive computer system, but it is interesting to note that you cannot get any diagnostic information presented to them on one of the many built in LCD displays, which would surely be just as easy as it telling you that you left a door open or that the washer fluid needs topping up.

## **Your Vehicles big secret.**

Along with the ECU's evolution, the complexity of their self diagnostic capability has also evolved immensely, and anyone who is able to gain access and use the features offered by each ECU will almost instantly understand how much quicker and easier it is to now find and fix even quite complex problems. However, rather than let everyone in on how much cheaper and simpler it has now become to perform repairs and servicing on their vehicles, and manufacturers have allowed everyone to continue in the misbelief that it is now more difficult, time consuming and costly to repair their vehicles, and bills certainly are not lower than before. So, not only is the technology not used as it should be to reduce the cost of repairs and servicing for the customer, but it is the customer who actually pays for the technology when buying the vehicle.

## **Professional Equipment VS OBD Scan Tool, what's the difference?**

Ever since built in self diagnostics was first thought of, manufacturers have employed ever more sophisticated measures to prevent anyone except them, or more accurately, users of their equipment, to be able to access it, and although OBDII legislation did force manufacturers to provide some degree of standardized access to some emission related fault codes as well as a handful of live data from the engine management, this is actually a pitiful drop in the ocean of what is really possible. OBD legislation does not even include the dozens of other vehicle systems which are usually fitted.

## **Anti Access Security**

In most earlier vehicles, the anti access measures employed by their designers are generally in respect of custom data formats, custom communication protocols, unknown data meanings and very specific timing sequence requirements. However even this has evolved over time and although basic mathematic encryption was employed as early as 1995 in some systems. Most modern vehicles require for access to any ECU, the correct reply of a cipher calculation of a key to a long line of randomly generated bits which are encrypted into seeds using a very sophisticated rolling code algorithm.

## **De Crypting the Codes**

Fortunately, the staff at Blackbox Solutions have the skill and experience in circumventing such Anti Access measures. As stated previously we do not manufacture OBD compliant Scan tool equipment. Our systems are quite unique in that it is typically able to provide users access, not only to the same features as the manufacturers equipment does, but also to features and capabilities that the manufacturers do not put in the equipment they supply to dealers. In essence our systems provide a degree of access and capability that is unheard of in the industry. Going way beyond just what is needed to fix problems, our systems allow alteration, manipulation and adjustment of hundreds more settings and features than most even thought was possible.

## **Faultmate SV**

Produced as a close cousin to our modular **FAULTMATE MV** system and sharing exactly the same software, the **FAULTMATE SV** is every bit as innovative and every bit as capable. The only difference is that where the **FAULTMATE MV** can be used by trade or private users on any number of vehicles makes and models, the **FAULTMATE SV** has been specifically designed at a vastly lower cost option for private enthusiasts to obtain diagnostic system for use on just one vehicle. Therefore, although **FAULTMATE SV** is very inexpensive at only around £410GBP to £970 (depending on the model) it is like all previous products developed by Blackbox Solutions, a professional manufactured dedicated system, capable in most cases of far greater control and much deeper access to any of the vehicles electronic systems than even the franchised dealer equipment.

## The Technology behind Faultmate SV

**FAULTMATE SV** is quite unlike any other diagnostic system, because the way it works is ultimately inspired by the well-proven and fast growing technology that is responsible for providing everybody with the modern Internet. On the Internet a standard PC user running very simple and straight forward browsing software such as AOL, Firefox, or Internet Explorer, clicks on a simple text link to request a page of information. The requested page may just be text, or it may contain live data such as the temperature in Melbourne or the wind speed in Alaska, but it is important to realize that the page comes from another computer located somewhere in the world. This computer is called a server. The browser software simply sends out a tiny request message which goes to the relevant server through a modem, and the phone lines that make up the Internet. The message may travel thousands of miles to its destination, which causes the small delay many Internet users are familiar with. Naturally a server which gives you the temperature in Melbourne is usually located there, and as well as being connected to the Internet, it is also connected to a temperature sensor, and the one in Alaska will also have a wind speed sensor connected to it. Whenever these servers receive the tiny request message, they then send back a page with the sensor information included to the browser software on the users PC from where the request came from. So although the user has just read the temperature of a sensor in Melbourne, their PC does nothing special or timing critical at all, as it is up to the server to get the information requested from the sensors or equipment connected to it.

## The Vehicle Server

With **FAULTMATE SV** the situation is much the same in terms of the user interface experience, although instead of connecting to a very big server on the Internet through a modem and phone lines, in our case the server we are connecting to (we call it a vehicle server) is now only a small black and silver box, and is directly connected to the users PC by nothing more than a simple cable. This means no connection to the Internet, no telephone bill and no time delays. The server is then connected through a simple in line interface (vehicle communications interface) to the vehicles diagnostic socket.

## Vehicle Explorer

We have written a special simplified vehicle version of a web browser which we call Vehicle Explorer. This software is supplied free with each vehicle server and gives you a simple menu to guide you to the right page for the vehicle system that you want to access. You simply click on the text link for anything you require and the vehicle explorer tells the vehicle server what you need. Instantly the vehicle server, which will have been constantly interacting with the vehicle system, will return a page with the information on. As well as pages of current fault code information and settings information, it can also supply constantly updating pages with real time (live) data on.

With such simple and instant access to every aspect of all the systems in your vehicle, you will soon realize how **FAULTMATE SV** represents a tool that will turn the powerful self diagnostic features built into all modern vehicle systems from working against you into working for you

The benefits of this ingenious solution are far too numerable to mention in full but here are just a few.

- 1) The system is so deceptively fast and smooth in operation; it completely hides just how difficult and complex it is to achieve such fast, accurate and reliable communications with vehicle systems.
- 2) Although all of the vehicle systems are different and have vastly different ways of doing things or presenting information, the user sees and handles each vehicle system in exactly the same way. That is for every vehicle system you have a read and clear fault codes function, a settings / information page, a live data value monitoring (Inputs) page, a page of drivable outputs and a page for any other function not fitting the other pages, such as learning key fobs (PLIPS), reset of adapted (learned) values or immobilization synchronization (see vehicle explorer doc)
- 3) There are very minimalist requirements on the PC's specification, because it does nothing that is timing critical at all. This means that anything from about a 266MHz Pentium 1 PC to the very latest PCs can be used. The software needs only a few MB of hard drive space and no Ram above what the operating system normally requires. It also only needs a minimum screen resolution of 800X600 (SVGA).
- 4) Due to the server being directly connected to the PC and the vehicle communications being kept active, there is very little delay (if any) between the user clicking on a text link and then seeing the result. In essence not only is it as simple as surfing the Internet, but without the traditional Internet problems such as long time delays before requested pages appear that changes according to the time of the day, unfound pages, missing servers, server down time problems, initial dial up waiting.
- 5) The Standard serial cable connection to the PC can be as long as you wish, within reason, and can be expanded easily to connect to USB by anyone who requires to connect to a USB only computer (we also supply

an optional adaptor for this). In addition we have designed the **FAULTMATE SV** with the capability to support a plug in Wi Fi and / or Bluetooth module which we intend to introduce as an optional extra before the end of 2007. This is expected to take the form of a small box with an antennae mounted on one side and a single umbilical cable to plug into the server on the other. It will likely have different mounting possibilities including suckers for attaching to bodywork or windows.

6) The pages shown are done in the Internet language of HTML, this means they have full colour and graphics capabilities to display any returned information, and full keyboard and mouse inputs for the user to make any selections, enter settings data or make any changes to read data, which is no more difficult than making selections or entering data on any other Internet form. In addition various options and style sheets can be changed to give different fonts, sizes, background and foreground colours. The menu bar can even be toggled between left and right hand sides to better suit use by left handed people on touch screen PC's such as the one shown.

7) The Vehicle Explorer software has been styled entirely using the standard windows style and in particular Microsoft's Internet Explorer, which is widely recognized as being the simplest user interface in the world, by the fact that it is used daily by millions of computer incompatible people without any problems.

8) The Vehicle explorer browser software is simple enough to be easily expanded in the near future to possibly include usage on PDA's Pocket PC's or possibly even Palm Organisers; this is where our Blue tooth or Wireless connection options will become really useful.

## Built in Help

Naturally the system has a massive built in help section with pages describing every aspect of using the system in great detail, sometimes even with illustrations, tables of pin outs and other pictures.

## Technical Support

To provide any technical support for your system that you may require after purchase, we have created a special Owners only interactive forum area on our web site. Once an owner's account has been activated by using the passwords supplied with each system, specific or general questions can be posted here to be read and answered by other owners, distributors and most notably all the staff at Blackbox Solutions Ltd including the systems entire development team.

All help and Information about the system, how to optimize its usage, what we are currently working on, hints, tips and software upgrades can all be accessed here and the collective knowledge of hundreds of like minded, friendly system purchasers can also be a huge benefit to the unsure or advice seeking enthusiast.

**It is most important to fully appreciate that the Technical Support forums we provide are the sole source of technical support for FAULTMATE SV, and although many may possibly have expected support to be available by E-mail or telephone, we do not accept or enter into providing support for our systems by any method other than these forums.**

The main reason for this is that the forums, are actually a vastly more advanced and cost effective method of providing the highest degree of technical support to the maximum number of customers from all over the world at the same time. Amongst the advantages are:

- 1) In many cases anyone with a problem or a lack of understanding will be able to instantly read posts made previously from other customers who had the same problem or question, and possibly find an immediate solution. This is far more useful than trying to contact us outside office hours.
- 2) Lack of duplicated effort. Once a subject has been covered, or existence of a problem identified and acknowledged, no more time for either the customer or us needs to be spent on it.
- 3) The forum posts are open to all our customers meaning if there is any problem with us or our systems, customers can group together and combine opinions and findings. Only proud and honest companies with nothing to hide would allow all its customers to interact with each other and us at the same time in such an open way.
- 4) The forums form a common contact point for anything related to the system, we can post notes about known problems, update releases, work in progress and expected delivery times on updates, give helpful pages of instruction and background information and cover matters you may be interested about in far more depth than in other places.

- 5) Blackbox Solutions does not benefit from any cost savings of providing support by forum. They are directly reflected in the systems price. This means the system costs less for you to buy as a direct result of the reduction of technical man hours that would otherwise be used repeating information, writing mails and on the telephone explaining the same things over and over again, which can of course also be better spent on growing and improving the system and thus benefiting everyone.
- 6) Our forums are monitored continuously by our technical staff and we even have a member of staff that has forum moderation as his main role in the company. On seeing any post requiring it, he can speak directly with the most suitable person(s) on the technical team who may well be the person responding to you. Within minutes of your raising a problem, we may well end up having a mini meeting of all the relevant software engineers, developers and designers especially to find the best and speediest resolution to any single problem. In essence you will get answers from the most suitable people in the world to solve your problem.
- 7) Besides our staff reading posts and offering an answer, existing customers, some of who have masses of experience of your exact problems can also offer their input.

## Coverage

**FAULTMATE SV** systems are available for every model of Land Rover and MG and all but the very oldest Rover Cars. Through its coverage of nearly 250 systems it will provide access to every vehicle system fitted in all variants of those models except the following 3 vehicle systems which are in development.

- A) Siemens MS43 V6 Engine management fitted to the North American V6 Freelander (not Rest of World).
- B) Tyre pressure sensor system in the Latest Range Rover (L322 2002 to present)
- C) V8 specific ECU's (Mainly Power train) in the V8 engine Variants of Rover 75 and ZT

## System validation & Licencing

To ensure correct system identification in any given vehicle, the SV server incorporates a special vehicle system scan capability. When ran on a vehicle it will prod every aspect of a vehicles on board system and produce a report page, which we can use to ensure we give you the correct activation codes to enable all the software licences you will need to communicate with every system on that vehicle.

## Swapping vehicles & Re Licencing

Although the FAULTMATE SV is designed for use only on one specific vehicle, the system can also be re-licenced by a remote code system to allow the owner to change vehicles. If the new vehicle is a different model that has a higher swap level, we will refund 50% of the original purchase price and offset this against the cost for the system for the new vehicle. If however the new vehicle is the same model, has the same or a lower swap level than the previous vehicle, the re-licence can be done for just a nominal £50 administration fee.

Whilst I am sure you appreciate how this flexibility on our part means that the system is as much a personal accessory for the owner rather than for the vehicle, I hope that you can also appreciate that we have to limit usage of the re-licencing capability to a minimum of six months between each re-licence event. The only exception to this is in the event of a vehicle being written off in an accident.

## Pricing Information

Below is a table showing our system codes for ordering each system, a brief model description of the models referenced by each system. The prices in UK Pounds, not including VAT where applicable or shipping costs, the payments if purchased under our easy payment scheme and finally the swap Level for re-licencing systems to other vehicles.

System Code	Vehicle Model	Total Price	Easy Monthly Payments	Swap Level
SV001	Range Rover (L322 /MK3) 01 to 07	£970.00	3 X £323	9
SV002	Discovery 3 (LR3)	£821.00	2 x £300 + 1 x £221	8
SV003	Range Rover Sport	£821.00	2 x £300 + 1 x £221	8
SV004	Freelander 2	£743.00	2 X £371.50	7
SV005	Range Rover (P38) 95 to 02	£593.00	1 x £300 + 1 x £293	6
SV006	Discovery 2	£591.00	£1 x £300 + 1 x £291	6
SV007	Freelander 1	£493.00	1 x £300 + 1 x £193	4
SV008	Defender 07 on eg TVE	£493.00	1 x £300 + 1 x £193	5
SV009	Defender pre 07 eg TD5	£493.00	1 x £300 + 1 x £193	4
SV010	Discovery 1	£512.00	1 x £300 + 1 x £212	4
SV011	Range Rover Classic	£512.00	1 x £300 + 1 x £212	4
SV012	Rover 75 / 75 Tourer / MG ZT/ZTT	£696.00	2 x £348	3
SV013	Rover 25/45/Streetwise/Comerce/CDV & MG ZS/ZR/MG(T)F	£547.00	1 x £300 + 1 x £247	2
SV014	Morgan (Gems)	£410.00	1 x £300 + 1 x £110	1
SV015	Morgan (14CUX)	£410.00	1 x £300 + 1 x £110	1

Prices shown are for software to cover all systems with on board diagnostic capability found in one single example of the listed vehicle model, and all hardware items required to connect between that vehicles diagnostic connector(s) and the serial port on the customers own PC. If the customers PC does not have a native serial port but a USB port instead, an additional USB to serial adaptor (AC002) priced at £15.00 will also be required.

### For more Information

For more detailed information, prices or to download our demonstration software and example files please visit [www.Blackbox-solutions.com](http://www.Blackbox-solutions.com) or mail us with any requirements, questions or comments to [info@blackbox-solutions.com](mailto:info@blackbox-solutions.com).

### How and where to Purchase

Orders for systems can also be placed on our secure web site [www.Blackbox-solutions.com](http://www.Blackbox-solutions.com) or by telephone to 00357 25 384427. Payments can be made in Sterling, Euros, US Dollars, Canadian Dollars or Australian Dollars, by bank transfer or by credit card. There is a small surcharge for credit card transactions. You will also find a list of distributors on our web site.