ROVER MEMS
DIAGNOSTIC SOFTWARE

Martin Rubenstein
discovers four new diagnostic packages that cover Rover cars.

In the May 2016 issue of *CM*, we published details of three diagnostic software packages that give Rover owners the ability to interrogate – and communicate interactively with – MEMS ECUs (versions 1.3, 1.6 and 1.9). All that is needed is a laptop, or Android device, and a special USB cable.

Those software packages available back in 2016 and still operating today were:

Colin Bourassa's MEMSGauge
https://bit.ly/3bukwmD

Alan Richey's MEMSAnalyser
https://bit.ly/3buTQCk

Pawel Wozniczka's Android app, MEMS Diag
https://bit.ly/32XeHdP

Since then, other developers have been hard at work, sharing ideas and knowledge, and giving the Rover enthusiast no less than four more diagnostic software packages, which show live data on a graphical user interface (GUI) and can also provide a logfile so that data gathered during a road test can be analysed afterwards.

Colin Bourassa has to be credited with laying the foundations, because, even where the developer has written his own code from scratch, Colin's work deciphering the MEMS protocols is still a central part of each package.

Colin's attention has now shifted to development of his highly-popular RoverGauge diagnostic software for the Rover 14CUX ECU.

In the past four years, the range of supported Rover vehicles has grown, as has the number of operating systems that can be used to run the software.

This project is still very much alive thanks to the enthusiasm and dedication of the developers.

CABLING REQUIREMENTS

▶ Linking the ECU to the laptop or tablet requires a USB-to-MEMS cable: a 5V USB-to-TTL serial converter with a MEMS connector (3-pin for MEMS 1.6, and OBD-II style for MEMS 1.9).

Our original article gave links to sites detailing how to make your own cable as well as suppliers of the parts. However, it is far simpler to buy a ready-made cable from one of the software developers like the ones shown right from **rovermems.com**. Not only can this work out cheaper, but sometimes interface settings on the laptop or tablet need to be changed in order to connect, and a proprietary cable removes all doubt over the integrity of the cable and saves much time troubleshooting non-existent faults and posting in the forum for help.

MEMS-ROSCO

| ECU ID: | Communications: ● ● | English | French | German | Spanish | EXIT |

overview fault codes emission all readings charts **readlog**

find and read file

choose only up to four graphs

doubleclick right mouse button for marker
press right mouse button for value
if you uncheck and then check rpm again scale with 6500 is on right yAxis

scroll wheel for shrinking graph

Ecu Id:
Type: mems-rosco-new

E:/Web browser/Desktop/mems-rosco/logs/2020-07-26_13.03.txt

| y-axis 10 | y-axis 50 | y-axis 100 | y-axis 200 | y-axis 500 | y-axis 1000 | y-axis 2000 | y-axis 6000 |

lambdavoltage — 435 435 435 435 435 435 435 435 435 435 435 435 435 435 435 435 435 435 435 435 435 435 435 435 435 440 440 440 440 440 440 445 445 445 445 450 450 455 460 465 470 470 480 — blue
490 495 500 510 520 525 530 540 540 550 530 530 520 495 490 470 440 410 385 360 345 330 315 300 290 280 270 260 250 240 235 230 225 230 235 235 240 230 235 230 235 260 250 710 — cyan

☐ 1 rpm right axis	☐ 7 battery D	☐ 14 idlehot	☐ 21 crank	☐ 28 fc0	☐ 35 stftr D	☐ 42 uk9	☐ 49 uk14
☐ 55 rpm<1500 D	☐ 8 throttlepot D	☐ 15 uk2	☐ 22 uk4	☑ 29 lambda voltage D	☐ 36 carboncanister	☐ 43 idle error2	☐ 50 uk15
☐ 2 watertemp D	☐ 9 idleswitch D	☐ 16 iac D	☐ 23 uk5	☐ 30 lambda frequency	☐ 37 fc1	☐ 44 uk10	☐ 51 uk16
☐ 3 ambient	☐ 10 uk1	☐ 17 idle deviation D	☐ 24 ignswitch	☐ 31 lambda dudycycle	☐ 38 idlebase	☐ 45 fc4	☐ 52 uk17
☐ 4 intakeAir D	☐ 11 park/nut	☐ 18 ignadvoffset	☐ 25 throttleangle	☐ 32 lambdastatus	☐ 39 uk7	☐ 46 uk11	☐ 53 uk18
☐ 5 fueltemp	☐ 12 faultcodes	☐ 19 ignadv D	☐ 26 uk6	☐ 33 closedloop D	☐ 40 uk8	☐ 47 uk12	☐ 54 jack count
☐ 6 map D	☐ 13 idlesetpoint D	☐ 20 coiltime D	☐ 27 airfuelratio	☐ 34 ltftr	☐ 41 ignadv2	☐ 48 uk13	☐ 55 rpm-low(mems-diag)

MEMS-ROSCO

▶ **Mems-Rosco** https://bit.ly/3IUsDha appeared shortly after our original article was published. It was developed by Leopold Genthner, who lives in Schweinfurt, Germany. He developed **Mems-Rosco** to use on his Mini 1.3 SPi.

This Windows package has translations into French, Spanish and German and works with MEMS versions 1.3 and 1.6; the software also comes with instructions in a PowerPoint presentation.

The GUI is very professional and has the look and feel of dealer-level diagnostic software. Not only can **Mems-Rosco** produce and graphically display a logfile of the data, but it can also read and display the logfiles from other MEMS diagnostic programs.

Alternatively, **MEMSAnalyser** https://bit.ly/3buTQCk (*shown right*) is still a very powerful and effective logfile reader, not least when used in conjunction with its sister program **MEMSLogger**.

Mems-Rosco can identify and clear fault codes, test and cycle actuators, and it also allows the user to adjust certain settings such as idle speed, idle decay, ignition timing and others. For the average user, this will be all they ever need – however, for the advanced user, the **Mems-Rosco** package contains a small DOS program called **readmems**, which can be used to interact directly with the ECU.
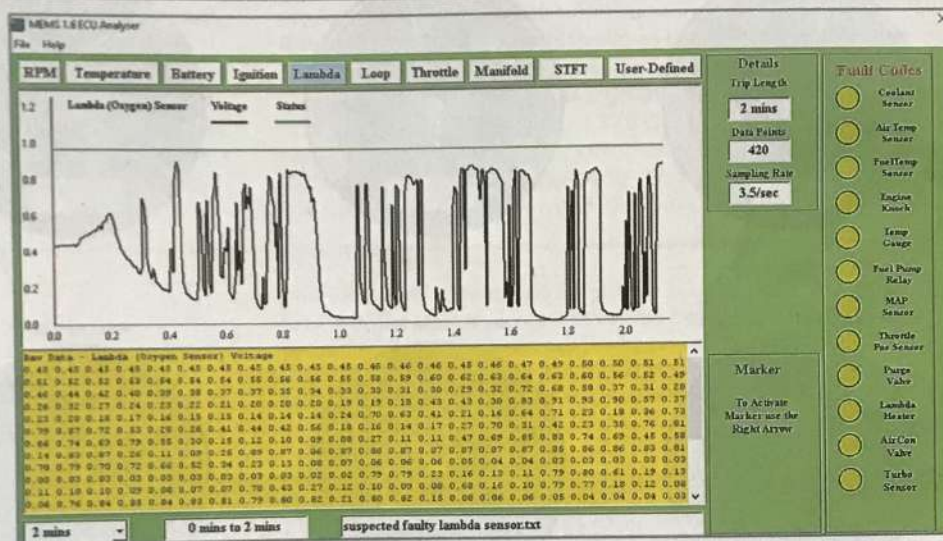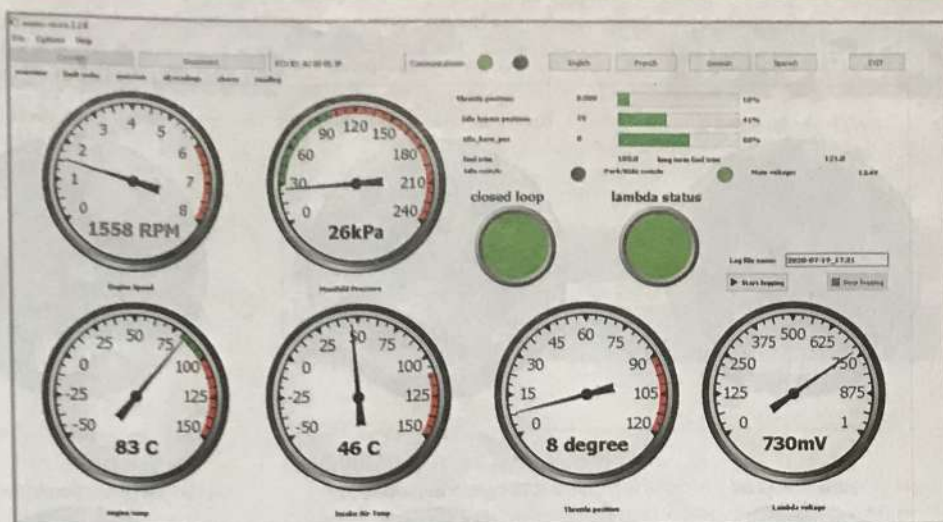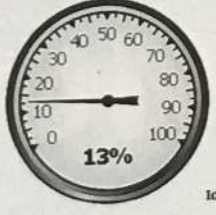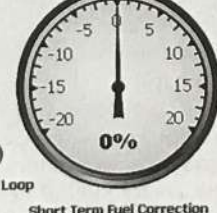
MEMS-SCAN

▶ **Mems-scan** https://bit.ly/2QU8EBb was developed by Haro Froger and is based on **Mems-Rosco**. Haro lives in the Netherlands and has a Mini SPi. It's hard to believe but this is Haro's first and only software-coding project.

Mems-scan similarly displays all fault codes and live data as well as allowing adjustments to idle speed, ignition advance and other settings. There is also an interactive facility, where actuators, such as the throttle stepper motor and Lambda heater, can be cycled and tested. Logfiles can be generated and read in **Mems-Rosco**, and, like that program, it is Windows-based.

MEMSFCR

Gauge	Value
(CAS) Engine Speed (RPM)	1072
(MAP) Manifold Absolute Pressure (kPa)	40
(TPS) Throttle Position (%)	-0
(IAC) Stepper Motor Position (Steps)	116
Battery Voltage (V)	13.1
(CTS) Coolant Temperature (°C)	65.9
(ATS) Air Intake Temperature (°C)	25.9
(OS) Lambda Voltage (mV)	52
Short Term Fuel Trim (%)	0
Long Term Fuel Trim (%)	222
Fuel : Air Ratio	14.4
Ignition Advance (°)	5

MEMSFCR

▶ **MemsFCR** is one of the two new kids on the block. Developed by Andrew Jackson in Basingstoke, **MemsFCR** is a Rover MEMS 1.6/1.9-compliant Fault Code Reader and analytical tool for MacOS and Windows 10.

Andrew has been a software engineer for 35 years and developed this package for his own 1993 Rover Mini Cooper SPi. However, he quickly realised how much demand there is for such software when he took his laptop to Owners' Club meetings. He says that having good and intuitive visuals was a central part of the design, together with the facility to export the data in human-readable form.

The MemsFCR website **memsfcr.co.uk** is comprehensive and explains all the features of the program. The GUI opens in the user's default browser. Like the other programs, it shows fault codes and gives the user the ability to alter various settings, such as idle speed and ignition advance. Live data values are displayed on the ECU Data page.

The Profiling feature shows a graphical display of five parameters, including RPM, and the Replay button gives the user the facility to replay the logfile afterwards; the logfile can also be displayed in **Mems-Rosco**.

MemsFCR is actively being developed, and Andrew is hoping to introduce in the near future an analytics pack that will do advanced diagnostics with machine learning. He is also planning a fault-finding mode to guide the user through a series of tests.

MEMS DIAGNOSTICS FORUM

▶ The Google group forum remains active and provides excellent support to users of these diagnostic software packages. Visit **https://groups.google.com/forum/#!forum/mems-diagnostics** to see for yourself.

MEMS Diagnostics   Shared publicly

30 of many topics

Fuel trim figures
By edbar...@googlemail.com - 20 posts - 60 views

MEMS 1.9
By svenska...@gmail.com - 36 posts - 761 views

mems rosco
By leopold - 7 posts - 55 views

Ecu readers
By sales.e...@gmail.com - 86 posts - 268 views

MEMS-Scan for Mac OS-X
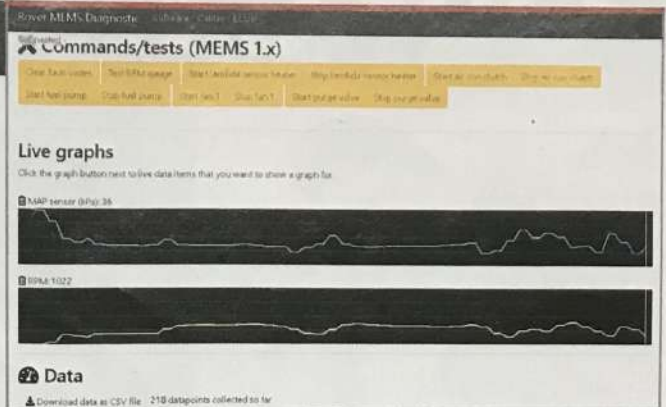By Andrew Jackson - 4 posts - 73 views

MEMS 1.3

ROVER MEMS DIAGNOSTIC

ROVER MEMS DIAGNOSTIC

▶ **Rover MEMS Diagnostic** is similarly a very ambitious package. Developed by James Portman in Manchester, it covers Rover cars from 1991 to 2000+, and supports all MEMS ECU versions: 1.3, 1.6, 1.9, 2J, and 3. For MEMS 3 ECUs it can also download the ECU EEPROM (memory chip) firmware with a view to remapping in the future. **Rover MEMS Diagnostic** also supports RC5 SRS/airbag modules.

James is an IT consultant, and this project, for which he wrote all the code, grew out of his work on a JDM Mini Cooper SPi. Surprisingly, no software gets installed – it is a website app. On visiting his website **rovermems.com** using a Chrome browser, the "Load the PC Web Application" button is selected, and the GUI then opens in Chrome. It is necessary to ensure that Chrome's Experimental Web Platform Feature is enabled, but the instructions are clear enough.

It works on Windows, Mac and Linux, as long as the Chrome browser is installed; James is working with the developers of Chrome to allow Rover MEMS Diagnostic to run in Android as a web application. Nevertheless, there is a working Android app version **https://bit.ly/3m3eQFk**, which supports MEMS 1.3/1.6 and 1.9, with a beta test version for 2J – and MEMS 3

Commands/tests (MEMS 1.x)

Live graphs
Click the graph button next to live data items that you want to show a graph for.

MAP sensor (kPa): 36

RPM: 1022

Data
Download data as CSV file   218 datapoints collected so far

compatibility is on James' to-do list.

Like all the other programs mentioned, it is completely free. Clicking on the small graph icon to the left of each of the 60 or so parameters in the data list, brings up a live data graphical display. **Rover MEMS Diagnostic** also allows the cycling of components such as the fuel pump and the oxygen-sensor heater.

rovermems.com contains a great deal of useful information on ECU identification and the TTL cables, as well as the various MEMS hexadecimal commands and protocols for the technically-minded. As previously mentioned, James can supply the cables at prices that make self-builds not worth the effort.

THE FUTURE

▶ Just when it seemed that this project, started by Colin Bourassa and advanced by exceptionally talented software developers, had reached maturity, it has been given an adrenaline boost, with new ideas and active plans for further development. Advances in IT over the past four years have also been incorporated. This project is helping to keep our Rover cars on the road; indeed, there is at least one Rover car that owes its continued existence to the owner's keen interest in this exciting project.