

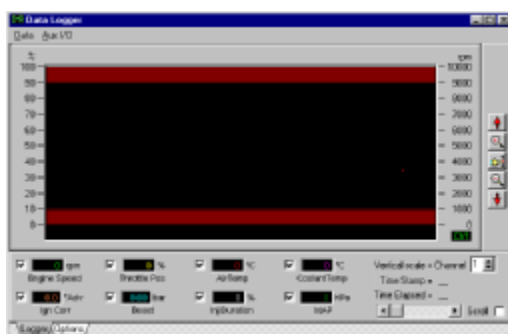
Data logger manual

Version 2

Overview

The PC control software now includes a data logger that can record 8 channels of information from the ECU. Selecting “Data logger” from the “Graph” drop down menu accesses the data logger screen. For ease of use you can also switch to the data logger screen by pressing F12 from the main software page. To switch back to the main software just press one of the main page shortcuts, i.e. F1 to F8, or click into the main software screen. The data logger screen will stay in place if you have enough room to view both the data logger and the main software at the same time. The logger screen continues to update and animate even when you have switched back to the main control software – it is sometimes helpful or interesting to watch the logging screen while running on the rolling road / dyno. To completely close the data logger screen click the close window cross on the top right of the logger window.

The data logger screen has two pages, the logger page and the options page, as shown below.



logger page



options page

The logger page is used to display the recorded ECU information as line plots. The options page allows you to select the data to be recorded on each channel and also when this data is to be recorded. The logger has a start and a stop trigger that tell the logger when it should be recording data. The start and stop triggers can be set to activate when a channel reading is above or below a set value or on a mouse click / key press.

While the logger is recording, the stored information can be viewed live in the logger page. The logger's plot screen is animated and will scroll to keep the most recent data on screen. At any stage you can hold the mouse cursor over any point in the plot and the recorded data at that point will be displayed in the channel data boxes at the bottom of the screen.

The recording status of the data logger is displayed on the bottom left of the main screens status bar. The status LED will be red when recording and grey/off when not.



logger recording status

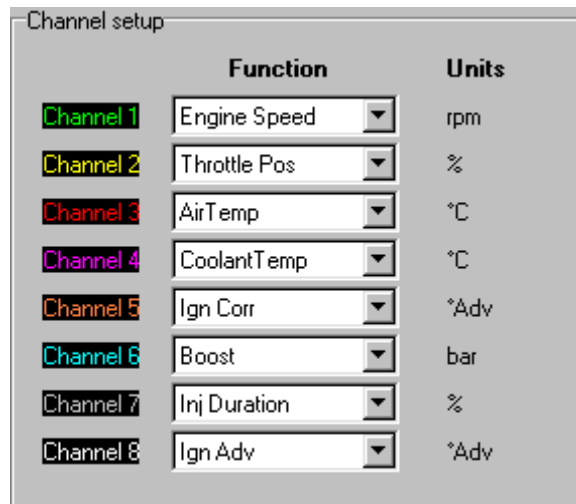
Data plots can be stored to disk for examination at a later date. The data log can be exported directly to a Microsoft Excel file for further analysis. Data plots can also be previewed and printed out in full colour.

Options page

Before using the data logger for the first time you will probably want to customise the channels to record the information you are interested in. Also, you may only want to record information when certain conditions are met, e.g. when the engine rpm is above 4,000 rpm or maybe only when the throttle is fully open. The options page allows you to configure the logger to suit these needs.

The options page is divided into two areas, the channel setup and the Auto-record trigger.

Channel setup

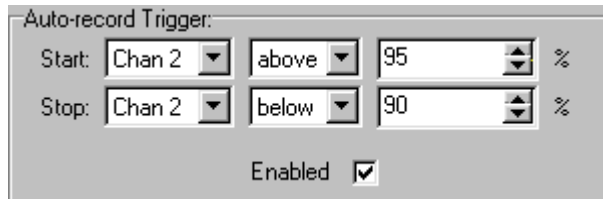


	Function	Units
Channel 1	Engine Speed	rpm
Channel 2	Throttle Pos	%
Channel 3	AirTemp	°C
Channel 4	CoolantTemp	°C
Channel 5	Ign Corr	*Adv
Channel 6	Boost	bar
Channel 7	Inj Duration	%
Channel 8	Ign Adv	*Adv

channel setup options

There are at present 40 different variables that can be assigned to any channel of the data logger. A few of these variables are actually the same information but stored as different units, e.g. boost can be recorded in Bar or Kpa. Click the channel **function** box to view the drop down list of variables. Select the variable you want to be assigned to that channel, the units for that variable will then appear in the **Units** column. The 8 channels are colour coded and these will not change regardless of the channel settings.

Auto-record trigger



Auto-record Trigger:

Start: Chan 2 above 95 %

Stop: Chan 2 below 90 %

Enabled

record trigger options

The auto-record trigger settings tell the data logger when to **start** and when to **stop** recording information. The logger can be set to record information when a value from one of the eight **channels** is **above** or **below** the set **value**. The **Enabled** tick box is an overall on/off control for the data logger. With the Enabled box un-ticked the data logger will be off and will *not* start recording regardless of the auto-record trigger settings. If the logger is already recording then un-ticking the Enabled tick box will stop it immediately.

In the example shown above the logger is set to **start** recording when the value from **Chan 2** is **above 95%**. The logger will continue to record the eight channels of data until the value from **Chan 2** is **below 90%**. For this example channel 2 is set to record throttle position %. From these settings you can see that the data logger will only be recording when the throttle position is above 95%. As soon as the throttle is below 90% the logger will stop recording. The resulting plots will then just relate to those values seen when the engine was near full throttle.

When setting the auto-record trigger to start/stop from one channel that may contain wildly fluctuating data (such as engine speed) it is a good idea to set the two trigger points apart a little. If you had set both the start and stop trigger values to 4,000 rpm any slight variation in rpm readings may rapidly start/stop the data logger as you cross the 4,000 rpm trigger point. In this situation you could set the logger to start recording at 4,000 rpm but only stop recording when the rpm had dropped to 3,950 rpm. *You should be careful not to overlap the start/stop trigger conditions otherwise the recording may not start or stop when you expect, e.g. setting the logger to start above 75% throttle and stop below 80% results in a non-start condition when the throttle reaches 76%. The logger is instructed to start recording as it is above 75% but at the same time it is told to stop as it is below 80%. In this case the logger will not start recording until the throttle reaches 80%, it will stop recording when the throttle drops to 79%.*

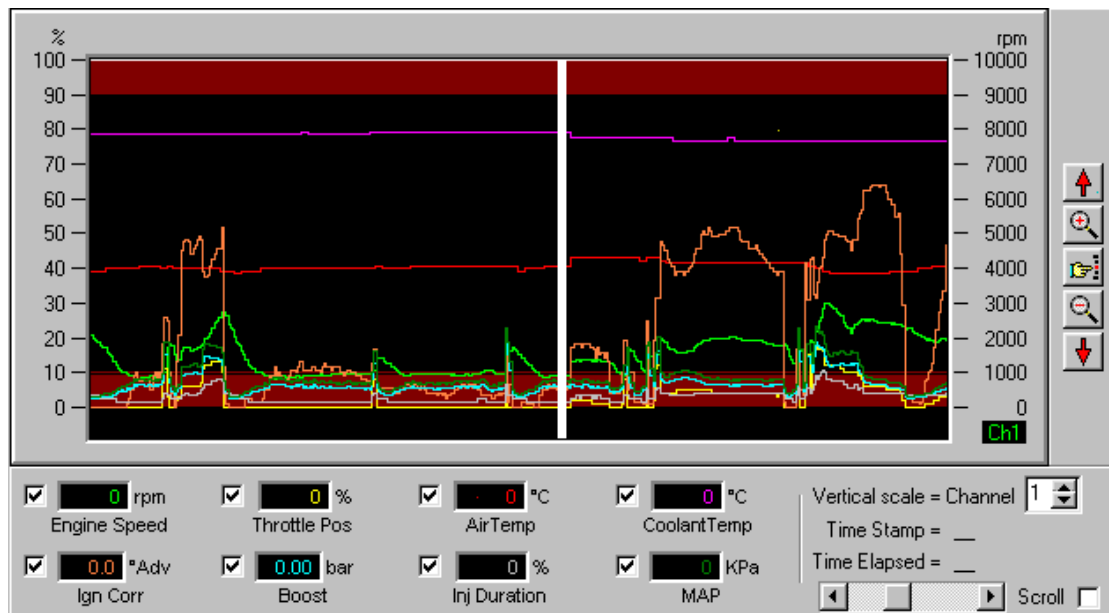
The Auto-record trigger channels can be set to **user**. The user setting allows you to trigger the logger by either pressing the space bar when in the “live adjustments” page or by clicking the mouse pointer in the recording status part of the main screen status bar.

Note: the logger will only record and can only start recording while there is an ECU link.

Logger page

The logger page is used to view the information recorded from the 8 channels. The information is plotted as a 8 line graphs each identified by the channel colours. The plots will animate as new information is recorded with the display scrolling from right to left. At any time you can view this information, regardless of the recording status.

The main part of the logger page is for the plotted data, the plot values / screen controls are at the bottom and the vertical position / scale / zoom controls are on the right side of the screen.



logger page

Each time the data logger resumes recording it identifies this point with a thick white vertical bar in plot (as shown above). The logger will record up to two hours of data before looping through it's memory. The logging memory is recycled using a first in first out method, i.e. the oldest data is discarded to make way for new data.

Scroll position

The logger screen will display about 45 seconds worth of data at a time. The horizontal scroll bar on the bottom right of the screen shows the position of the screen in relation to the total recorded plot.

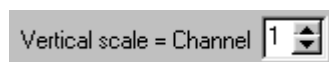


logger scroll/position controls

With **Scroll** ticked the screen will be scrolled from right to left to keep the most recently recorded data in view. The plot can be manually scrolled through the contents of the loggers memory using this scroll bar. As soon as the screen is moved manually the automatic scroll function will be switched off, the **Scroll** option will be un-ticked. This allows you to scroll through the memory contents to view recorded data while the logger is still recording. When finished you can re-enable the automatic scroll function by clicking the **Scroll** tick box. To scroll through the recorded data you can click either the left or right arrows on the scroll bar for fine control or click either side of the position indicator for coarse control. The position indicator can be dragged from side to side to move rapidly through the plot. Once the scroll bar is active the plot can be controlled from the keyboard using the home, end, page up, page down and the left/right arrow keys.

Vertical position

The right hand vertical scale can be changed to suit any of the eight channels. Click the vertical scale up/down arrows to select any channel.



vertical scale control

The controls on the right side of the plot can be used to adjust the vertical zoom and position of the plot. These controls are...



move the plot up



zoom in



reset the plot zoom & vertical position back to the default



zoom out

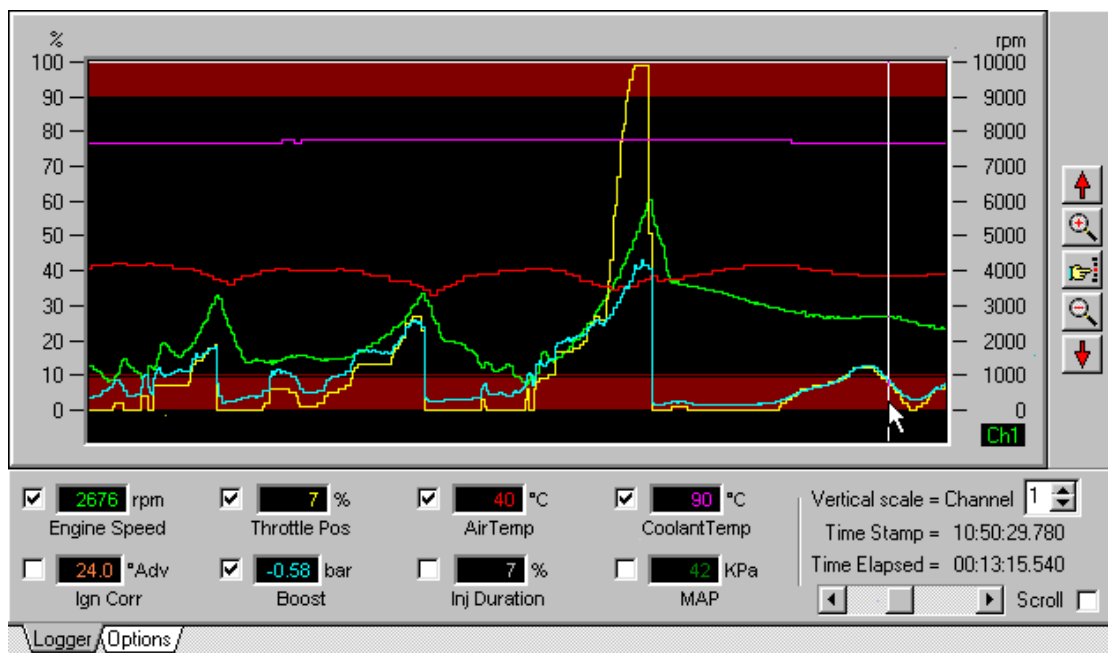


move the plot down

Viewing data

By moving the mouse cursor over the data plot area a vertical indicator bar will appear and follow the horizontal position of the mouse. The data at the position of this bar is displayed in the plot values area at the bottom of the screen. The time stamp (the precise moment this data was recorded) is shown just above the horizontal scroll bar.

The plot for each channel can be, switched off / hidden from view, individually to make the display easier to work with. Click the tick box next to each channels data value to enable or disable the plot on the display.



plot example

Time Stamp

In the example above you can see that the Inj Duration & MAP plots have been disabled/hidden. The 8 channel values reflect the plotted data at the mouse pointer vertical bar which has the time stamp of 10:50:29.78. This time stamp has the format of hours:minutes:seconds.milliseconds which was taken from the PC's clock when that data sample was taken.

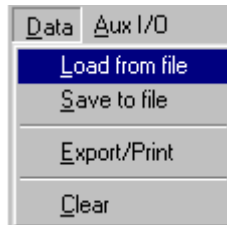
Time Elapsed

The time elapsed value is the distance, in time, of the indicated values from the reference point. By default, this reference point is the first data entry in the data loggers memory. You can see in the example above that the plotted data at the mouse pointer vertical bar is 13 minutes and 15 seconds from the start of the log.

The reference point that is used to calculate the “Time Elapsed” can be moved to any point in the plot by just clicking the mouse at the desired point. The time elapsed calculations will then be referenced to this new point. This maybe useful to quickly measure the time of an event without resorting to any mental arithmetic, e.g. you could click at the point where the throttle position reached 100% then move the mouse to where the throttle was returned to 0% - the time elapsed will then show how long the engine was on wide open throttle. Clearing the logger memory or loading a new log from disk will reset the reference point to the default (start of the logger memory).

Logger Menu

There are two drop down menu items available, **Data** and **Aux I/O**.



Load from file

Clears the data logger memory and retrieves a previously saved data log from disk.

Save to file

Stores the entire data logger memory to disk. When the data is stored two files with different extensions are created, *.lg1 and *.lg2. When transferring/e-mailing/etc these files remember to include **both** of these! One file contains the raw data and the other configures the logger channels to ensure the data is displayed correctly.

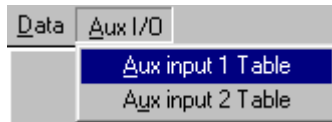
Export/Print

Displays a print preview of the current logger screen. The start/stop positions of the plot can then be adjusted and either printed or exported to an Excel file. The export/print option is covered in more detail later in this manual.

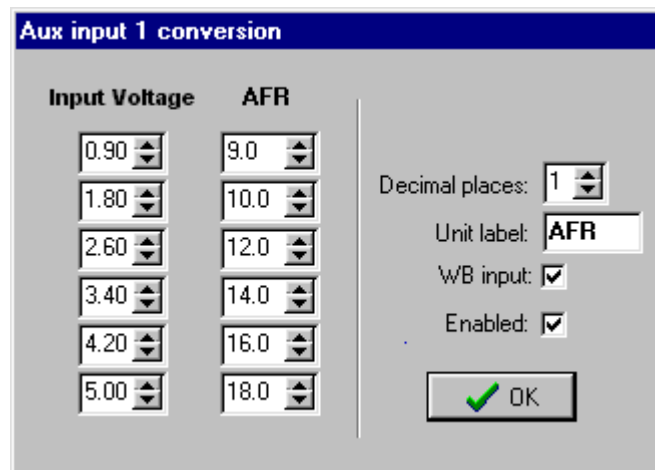
Clear

Erases the entire contents of the data loggers memory.

Aux input table



The ECU has two aux analogue inputs that can be used for a number of functions. The logger will record the value of these inputs as it sees them, i.e. a raw number 0 – 1023 reflecting 0 – 5v. To convert these inputs to a more usable value you can use the **Aux input Table** to convert the voltage at the input to the ECU to your own value including the decimal precision and unit label.



The dialog box is titled 'Aux input 1 conversion'. It contains two columns of spinners for 'Input Voltage' and 'AFR'. The 'Input Voltage' column has values 0.90, 1.80, 2.60, 3.40, 4.20, and 5.00. The 'AFR' column has values 9.0, 10.0, 12.0, 14.0, 16.0, and 18.0. To the right, there are settings for 'Decimal places' (set to 1), 'Unit label' (set to AFR), 'WB input' (checked), and 'Enabled' (checked). An 'OK' button with a green checkmark is at the bottom right.

Table for converting the voltage at Aux analogue input 1 to AFR

The example above shows an **Aux input 1 Table** that converts the voltage at the ECU's aux analogue 1 input to an AFR reading. Here, an external wide band AFR mixture reader provides a 0-5v output for an AFR range of 9.0 to 18.0. The AFR meter is supplied with a transfer curve and these details have been entered in the conversion table. The data logger can use the result of this voltage to AFR conversion by selecting Aux input 1 for a channel in the channel setup (options page of the data logger).

When entering data, the input voltage *must* have the lowest voltage in the top box and the highest voltage in the bottom box. Adjust the 6 voltage inputs to suit the range of the input signal. To the right of each voltage box you can enter a value that you want this voltage to be converted to. The voltage steps can be spaced as required, the software will apply linear interpolation between each voltage/value box so a non-linear 0-5v with any offset can be used.

Adjust the number of decimal places you want the output value to show – you have the choice of 0,1 or 2 decimal places.

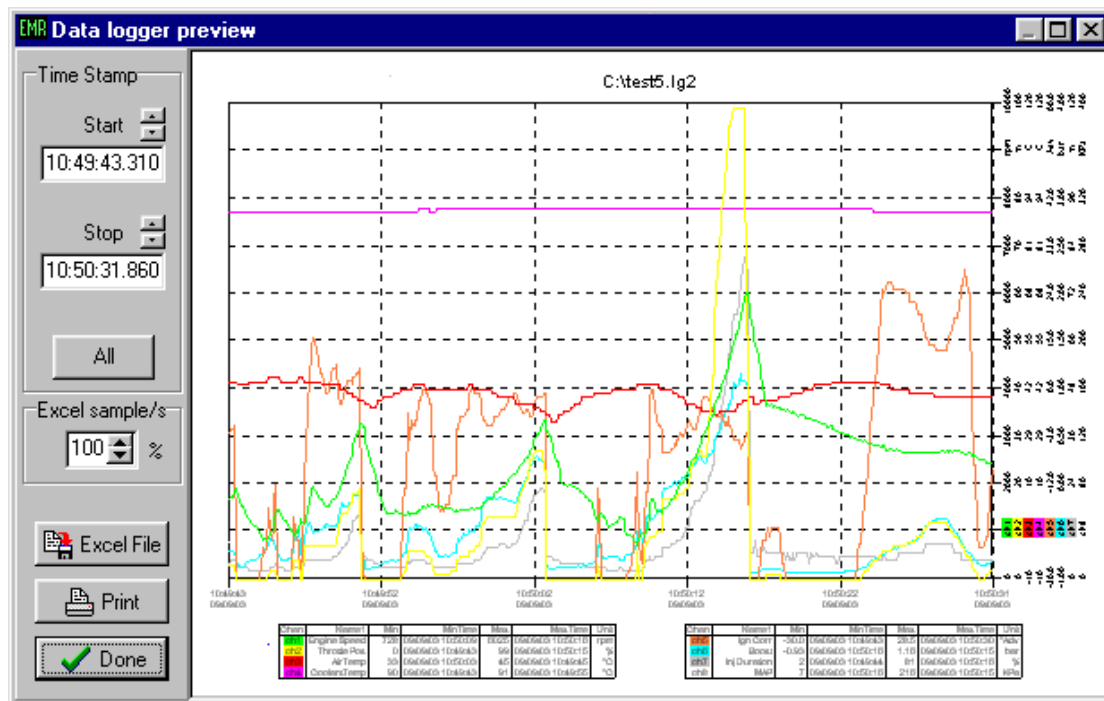
The unit label, in this case “AFR” will be shown as the channel units in both the logger display and the options page.

The **WB input** tick box is used to indicate that this input is an AFR/lambda conversion. When ticked the software will display the conversion result and unit label in the “live adjustments” screen just below the lambda LED display.

The **Enabled** tick box enables or disables this table. When disabled the Aux inputs 1/2 inputs return to the normal 0-1023 raw input values.

Export/Print

Selecting **Export/Print** from the **Data** menu brings up a print preview screen.



print preview screen

The print preview will show the data as displayed in the logger screen. By using the time stamp adjustments on the left of the screen you can move the start/stop points of the preview to arrange the screen that you want to print. By moving the start/stop points you can zoom in on an area or condense more information into the same printout.

Selecting the **All** button will change the start/stop points so the entire data logger memory is previewed.

Selecting the **Print** button will bring up the options window where you can select your printer/paper options and print the graph. The plot will print in landscape to maximise the paper area. A legend identifying the plot channels and a max/min value table are also printed with the plot.

The **Excel File** button allows you to store the data logger memory directly to an Excel file. This file is preformatted and will load directly into Microsoft Excel without any further conversion. The data logger will record at a rate of between 15 to 20+ samples per second depending on the communications traffic between the PC and the ECU. You may find that this is more detail than necessary when exporting to Excel, adjusting the Excel sample/s value allows you to export between 5 – 100% of the recorded data. This equates to an adjustment of roughly 1 sample per second at 5% to 20 samples per second at 100%. **Note: only the data displayed in the preview will be exported. To export the entire plot stored in memory hit the ALL button first.**