

# HONDALOGGER

# MANUAL



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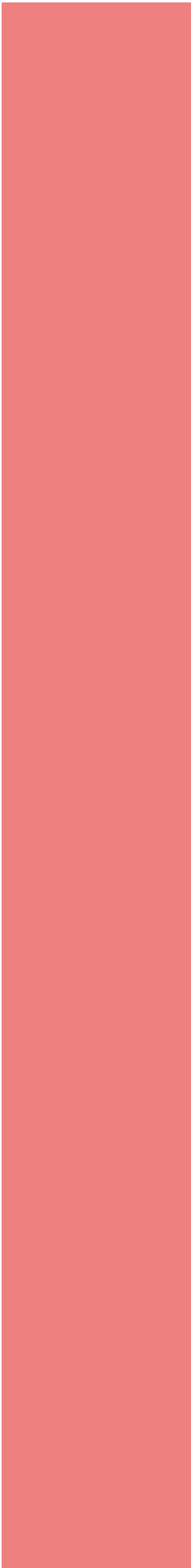
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# INTRODUCTION



**Hondalogger** datalogging is enabled via the addition of a cable and computer chip to the interface board already installed as part of your purchase of the Hondadata computer upgrade Stage 2.

Hondalogger software allows you to examine in real time (75-500 readings per second depending on computer) all values from all engine sensors and display an electronic version of the dashboard

Information in this detail has rarely been available before, allowing you see the relationships between variables and see the actual operating conditions of the engine on the road or track.

How fast was I going; what revs and throttle was I using; what gear was I in; how hot was the engine; are my injectors maxing out? Answers to these and many more. Honda Datalogger teaches you an immense amount about your car and driving.

For example, changes in intake air temperature affects performance. Hondalogger allows you to graph the intake temperature over time and in different conditions, Then when you make changes, Hondalogger allows you to measure the changes and determine if you are going forwards or backwards.

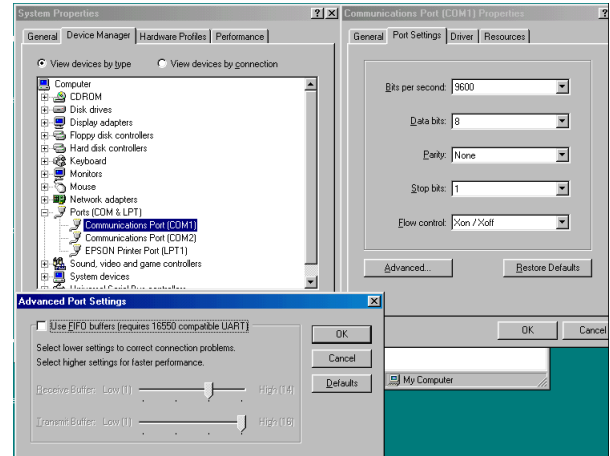
Some sensors are not yet logged for OBD 1 computers. These will be available via a free upgrade ROM for your ecu when available.

The Honda Datalogger software requires a minimum of a 8Mb 486 with Windows 95. All datalogging and development were done by Hondadata on a 16Mb Pentium 75 laptop running Windows 95. Additional memory is required for the maximum 6 hour recording time. Hondalogger has also been tested on an Apple iBook running OS 8.6

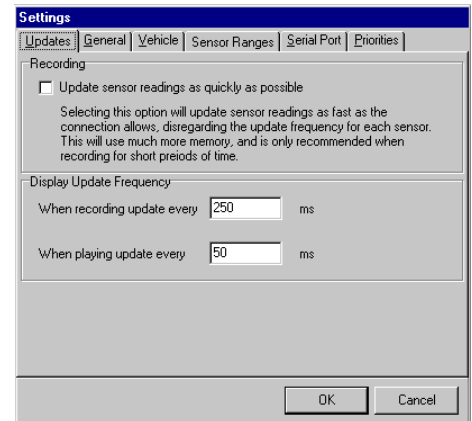
# SOFTWARE SETTINGS



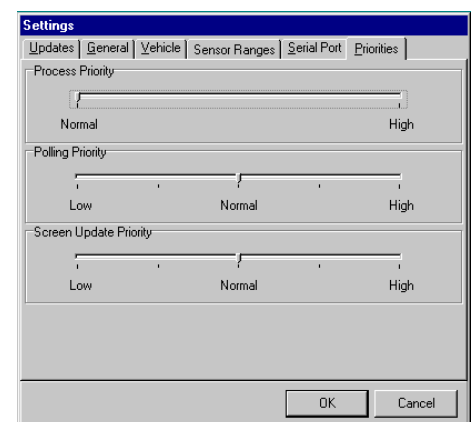
Firstly open the device manager by right clicking on My Computer. Go to the advanced port settings for the serial port you are using and disable the FIFO buffer. Failure to do this will result in an unreliable connection between your Laptop and engine computer



On a Pentium 75 laptop Hondalogger can record over 150 sensor readings per second. To do this the screen display cannot be updated instantaneously. For faster recordings try longer screen update frequencies of 500 ms (half a second or more. With faster laptops try a shorter screen update frequency.



Windows can allocate different amounts of processor time to different tasks. Polling is the task of asking the Honda engine computer for the sensor readings. Moving the polling priority to low significantly reduces the number of sensor readings per second (known as load). Setting the priority to high will make the mouse and screen very sluggish occasionally taking several seconds to respond, but the sensor recording rate will be very good

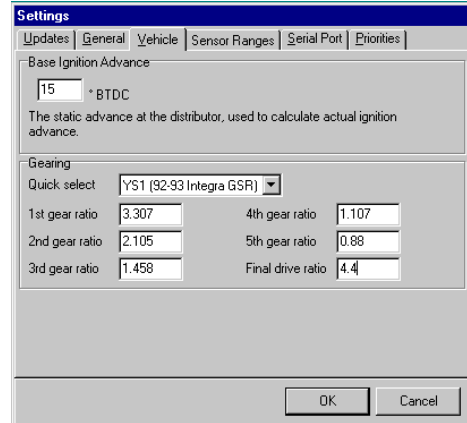


# SOFTWARE SETTINGS

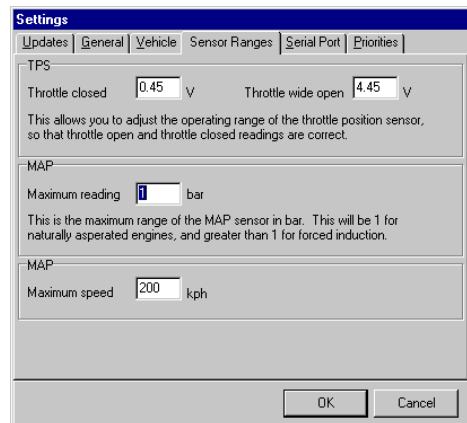


Speedometers are commonly inaccurate. In order for Hondallogger to accurately display speed and gear choose from the list here or key in a known set of gear ratios. Tyre Circumference (use a tape measure) or aspect ratio and rim size is also needed. The static advance - commonly set to 15 degrees is added to the amount the computer calculates to give the graphed total advance.

Addendum. For OBD 1 computers it has been determined that the actual advance is ecu value + base timing less 20. For example if the base static timing is 12 degrees, Type -8 (12-20) into the setting here. This will be simplified in a future release of Hondallogger.



All Hondas have slight variations in the positioning of the throttle angle sensor, for which there are adjustments. With the ignition on and car not running, go to the ecu screen. Note the throttle angle voltage. Press the throttle fully to the floor. Note the voltage and key both results. This gives your 0-100% throttle range. MAP is the Manifold Absolute Pressure Sensor. It reads the air pressure like a barometer. One Bar is atmospheric pressure. Two Bar is equivalent to 15 psi of boost.



# SENSORS



The screenshot shows the HondaLogger software interface. The title bar reads "HondaLogger - F:\Virtual PC® 2.1.2\1st coast gladstone rd.rec". The menu bar includes File, Edit, Recording, Play, Graph, and Help. The toolbar contains icons for Save, Open, Record, Connect, and Displays. The main window displays a table of sensors with columns for Log, Sensor, Value, Units, and Update (Hz). The table lists various sensors such as Revs, Speed, O2 Sensor A, Water Temp, Air Temp, ALT, EACV, MAP, Injector Duration, Duty Cycle, Ignition Advance, VTEC Pressure, Brakes, A/C Switch, Start, Fuel Pump, Purge Valve, Check Light, A/C Relay, VTEC Spool, Error LED, Knock, and TPS. Annotations with arrows point to specific parts of the interface, including the playback controls, the recording time and file size, and the sensor table.

Log	Sensor	Value	Units	Update (Hz)
<input checked="" type="checkbox"/>	Revs	1205	rpm	20
<input type="checkbox"/>	Speed	0	kph	20
<input checked="" type="checkbox"/>	O2 Sensor A	0.000	V	5
<input checked="" type="checkbox"/>	O2 Sensor B	0.000	V	5
<input checked="" type="checkbox"/>	Water Temp	0.742	°C	1
<input checked="" type="checkbox"/>	Air Temp	3.125	°C	1
<input checked="" type="checkbox"/>	ALT	0.000	V	1
<input checked="" type="checkbox"/>	EACV	0.000	V	1
<input checked="" type="checkbox"/>	MAP	0.321	bar	20
<input checked="" type="checkbox"/>	Injector Duration	1.754	ms	20
<input checked="" type="checkbox"/>	Duty Cycle	1.76	%	20
<input checked="" type="checkbox"/>	Ignition Advance	36.500	°	10
<input checked="" type="checkbox"/>	Ignition Advance Lookup	35.500	°	10
<input checked="" type="checkbox"/>	VTEC Pressure	off		10
<input checked="" type="checkbox"/>	Brakes	off		10
<input checked="" type="checkbox"/>	A/C Switch	off		10
<input checked="" type="checkbox"/>	Start	off		10
<input checked="" type="checkbox"/>	Fuel Pump	on		10
<input checked="" type="checkbox"/>	Purge Valve	off		10
<input checked="" type="checkbox"/>	Check Light	off		10
<input checked="" type="checkbox"/>	A/C Relay	off		10
<input checked="" type="checkbox"/>	VTEC Spool	off		10
<input checked="" type="checkbox"/>	Error LED	off		10
<input checked="" type="checkbox"/>	Knock	0		10
<input checked="" type="checkbox"/>	TPS	-2.95	%	20

Hondallogger gathers and graphs information from two kinds of sensors. Real sensors such as **Speed** and calculated sensors such as **gear**. There is no actual gear sensor as such, but the gear is calculated from speed, revs and gearbox information as detailed in settings.

**Revs** are determined from timing pulses coming from the distributor.

The **speed** sensor is located in the gearbox near the differential and is used by the computer to limit top speed and to determine when to engage the high lift cam. Disconnect this sensor and the high lift cam will not work. Early Integras used a cable drive from the gearbox with the speed sensor located in the instrument cluster.

**O2 sensors** measure the oxygen content of the exhaust gas and must be hot in order to function correctly. 0.70 to 0.8v is the range in which the computer considers the engine is running with the correct air/fuel ratio. Higher than this is considered rich, after which the computer will attempt to reduce the injector opening time to lean out the mixture. Lower than 0.7v the engine is running lean. The computer will lengthen the injector pulse by a percentage to enrichen the air-fuel ratio. This is known as closed loop because of the feedback employed. At wide open throttle the computer uses open loop and generally ignores the O2 sensor readings.

# SENSORS



**Water Temp (TW)** is calculated from a temperature sensitive resistor mounted high in the engine. A common tuning hack for those that have no access to the fueling maps is to increase the resistance the computer sees on this sensor so cold enrichment is provided. Unfortunately this is no guarantee the amount of excess fuel provided is correct.

**Air Temp (TA)** is a fast acting sensor mounted in runner 1 of the intake on earlier Hondas and before the throttle body on later Hondas. A very important sensor to observe and graph. For every 3.3 degree rise in intake air temperature, you drop 1 % air density and therefore power. Typically air temperature can rise 10-15 degrees through the intake.

**Alt** is the alternator control voltage. By controlling the field coils of the alternator, the engine computer keeps the battery voltage very constant and stable.

**EACV - Electronic Air Control Valve-** is the idle control. On the intake manifold, there is a solenoid controlled valve which regulates the passage of air around the throttle butterfly. The EACV controls the amount this valve opens by. For example when the air conditioning switch is on, the valve is opened more so as to maintain the idle speed.

**MAP** is the **Manifold Absolute Pressure** sensor. Mounted reasonably close to the throttle body the MAP sensor measures the air pressure inside the manifold. Think of it as a barometer. If the car is switched on and not started the MAP reads the atmospheric pressure. At higher altitudes where the air pressure is lower the Map voltage is will be lower at full throttle. The engine computer uses this reading to determine the amount of oxygen entering the engine.

**Injector Duration** is the time in milliseconds (thousandths of a second) the fuel injector is held open. If you examine the graphs you will find that in certain driving situations the injector duration goes to zero. A naturally aspirated B16A has a maximum injector opening time of around 10-12 ms.

**Duty Cycle** is a calculation based on what percentage of an engine revolution the injector is open. 80% is a commonly regarded as the maximum time an injector should be open. Much more than this and fuel flow rates and patterns become inconsistent. If you are regularly exceeding this figure, consider larger injectors.

**Ignition Advance** is the number of degrees of engine rotation before top dead centre (piston is at its highest position). The more densely packed the inlet charge the shorter the time between the spark and when the force is exerted on the piston. Too much advance and the force of the combusting charge can push down on the piston while it is rising, resulting in dangerous pressures, broken conrods and bolts and blown head gaskets.



# SENSORS



**Ignition advance lookup** is the value the computer has stored for that particular combination of RPM and map sensor values. The ignition advance lookup value is modified when the computer detects knock (see later) or when the throttle is rapidly opened or closed. Once these modifications have been applied (usually by no more than a few degrees) this then produces the ignition advance value, as described above.

**VTEC Pressure** is either on or off and is on when the high lift cam shaft is activated. Usually the water temperature must be high enough, the VTEC pressure sensor must show that there is sufficient oil pressure and the speed sensor must show greater than approximately 20 mph, before the high lift cam will be activated.

**Brakes** will show on or 1 on the graph when applied.

**A/C Switch** will show on if switched from the dash.

**A/C Relay** will show on when the computer decides to activate the air conditioning. If graphed you can see what percentage of your journey the air conditioner is in use.

**Start** activates while the car is being cranked. This signals the computer to enrichen momentarily inject a little extra fuel.

**Fuel Pump** shows on when the main fuel pump relay is activated - which is most of the time.

**Purge Valve** is when the computer clears the emissions from the charcoal canister.

**Check Light** is the yellow engine warning light as shown on the dash. Hondata can program this light as a gearshift indicator to flash at a predetermined RPM.

**VTEC Spool** is the high lift cam activation relay, which shunts oil pressure to the rockers and cam change mechanisms.

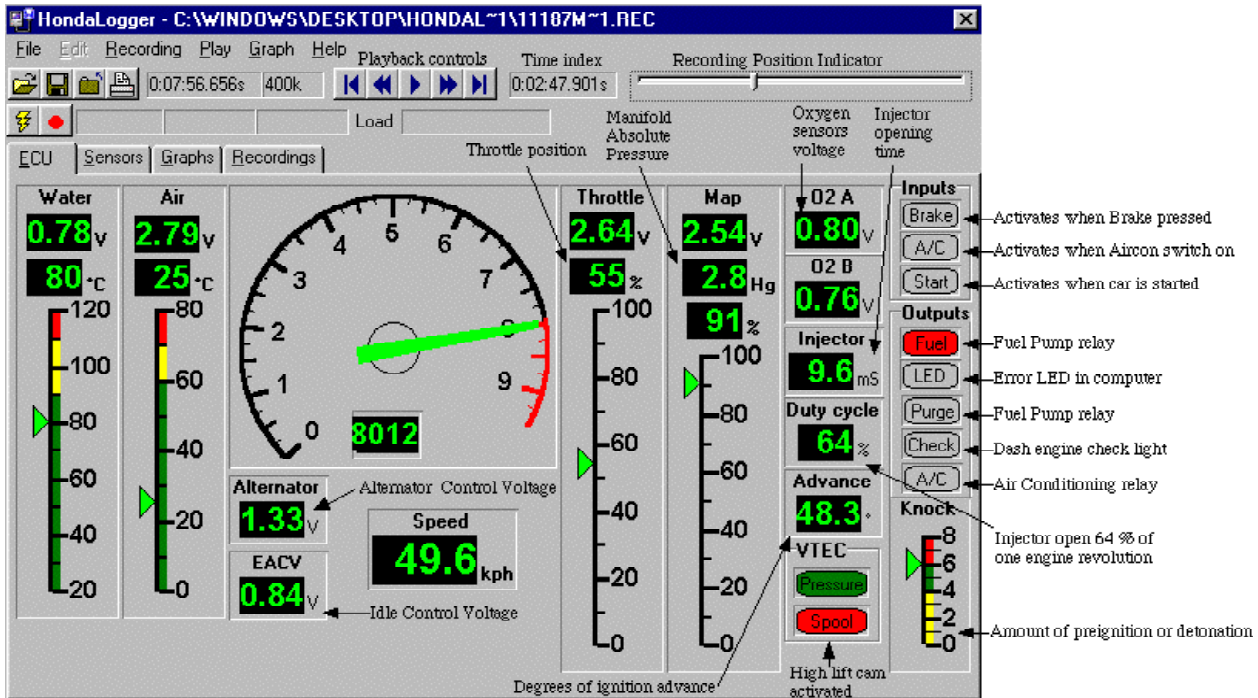
**Error LED** - For older model Hondas this flashes an error code to indicate to technicians out of range sensor readings or faulty sensors.

**Knock** is a measure of detonation or preignition. The knock sensor listens to the vibrations or noise signature coming from the engine. If knock is detected, usually the ignition is retarded to stop it. Knock can be caused by a lean mixture, an overheated engine or low octane fuel.

**TPS** is the **Throttle Position Sensor**. It measures the throttle position varying from 0 (closed) to 100% (fully open). The TPS needs to be calibrated in the settings under the FILE menu.

**PA** is the air pressure sensor (not found on early Hondas) which provides a necessary reference for the computer as the car changes altitude.

# ELECTRONIC DASH



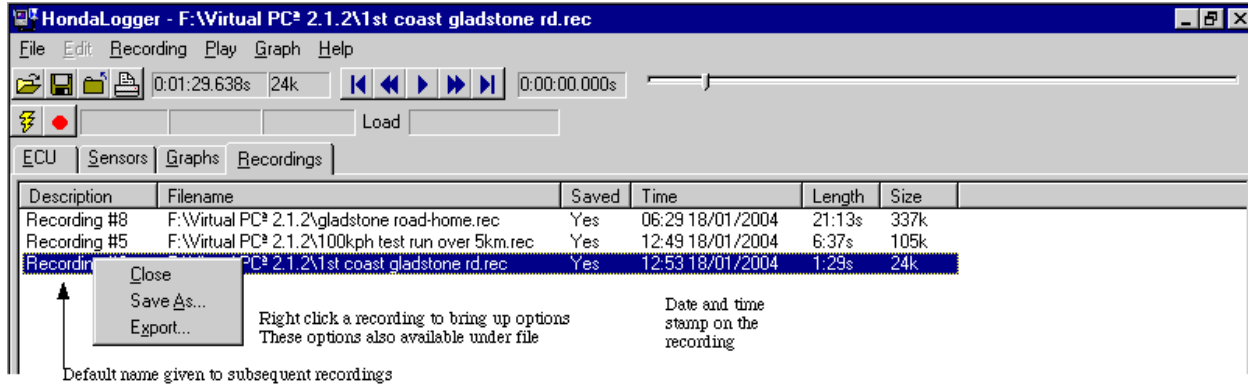
The dash screen gives an instantaneous readout of all the sensors that have been selected on the sensors screen. The key F10 or is used to connect and disconnect Hondallogger to the Honda engine computer. No recording of these sensors takes place while this screen is being displayed unless F9 or is also pressed.

For many of the sensors, the raw voltage as generated by the sensor and its converted value are both displayed.

If you are playing back a recording, then dragging the recording position indicator with the mouse moves you quickly forwards and backwards through the recording. The time index shows how far into the recording is displayed. The recording position can be coarsely adjusted using the left and right arrow keys and finely adjusted using the control and arrow keys.

This fine control helps you identify engine events such as knock on a very short time scale - less than 100th of a second.

# RECORDING



A recording is started when F9 is pressed or **Start Recording** is chosen from the file menu. If Hondalogger is not already connected to the engine computer then a connection will be made.

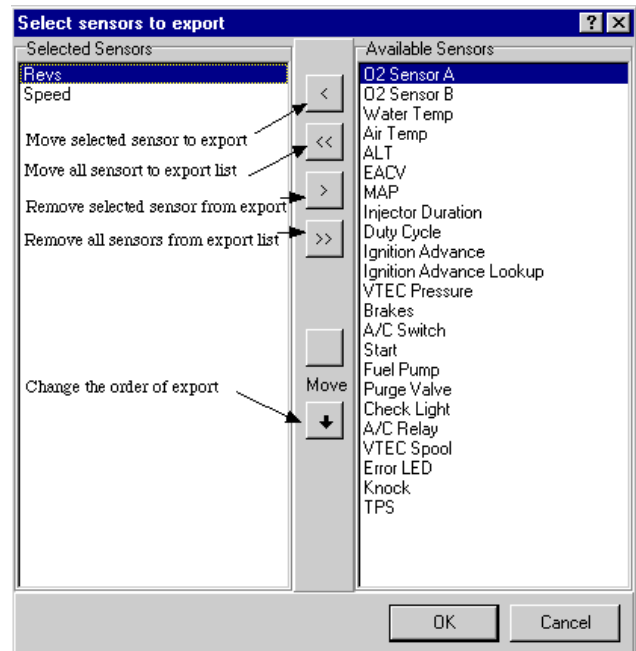
The recording is stopped when F9 or F10 is pressed or the car is switched off and Hondalogger cannot maintain a connection with the engine computer.

If several successive recordings are made, they are labelled as Recording #1, Recording #2 etc. No recording is saved to disk until that recording is selected with a right mouse click and **Save as** chosen.

The **View** menu is a quick way to change between saved recordings. When a different recording is selected all the graphing data under GRAPH changes, but the graph types do not change.

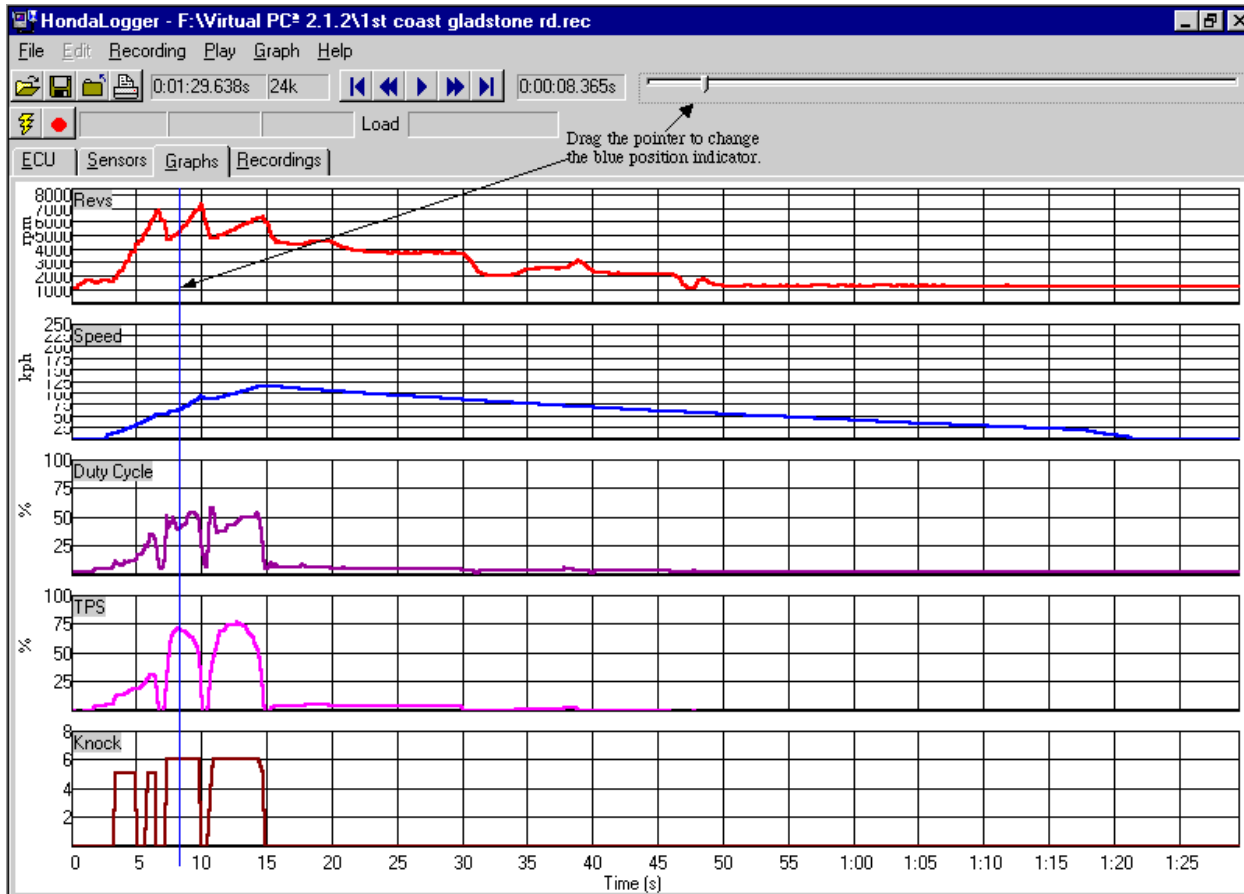
**Export** (Also under the **file** menu) allows you to select sensors and export the information in tab delimited text file format for importation into databases and spreadsheets for further analysis.

The export format consists of two values, time index value and sensor value. Each individual sensor log is exported as a separate file.



*Sensor Export Dialog box*

# GRAPHING



0-125 Kph acceleration run

The number of graphs simultaneously displayed is dependant on your screen size. On a SVGA screen of 800 by 600 pixels, five is a comfortable number.

If the graphs are displayed while a recording is in progress, sensor data will be plotted live according to the time interval chosen under **Settings**, which is by default 10 seconds.

**Show Full length** from the **Graph** menu scales your chosen recording to fit the screen width. Use the position indicator to move the vertical blue bar to any areas of interest. Then from the graph menu select **Zoom in** ( Ctrl up arrow) or **Zoom out** ( Ctrl down arrow)

**Add Sensors** gives access to the complete sensor graph list, not just those listed Ctrl 1-9.

Printing preferences are best set to landscape (sideways) for the graphs. Details of the printed graphs are substantially better than the on-screen display.

Graph	Choose which sensors are graphed
<input checked="" type="checkbox"/> Revs Ctrl+1	
<input checked="" type="checkbox"/> Speed Ctrl+2	
<input checked="" type="checkbox"/> TPS Ctrl+3	
MAP Ctrl+4	
Water Temperature Ctrl+5	
Air Temperature Ctrl+6	
Injector Duration Ctrl+7	
Ignition Advance Ctrl+8	
O2 A Ctrl+9	
O2 B	
Add Sensors...	Add Additional sensors not listed above
Remove Sensors	Delete Additional sensors not listed above
Zoom In Ctrl+Up	Magnifies the graph of sensors. Shows a shorter time interval
Zoom Out Ctrl+Down	Shows a wider time interval of the sensors being graphed
Show Full Length Ctrl+F	Shows the entire recording of the sensors being graphed