

EDL8 Race Dash Manual
Engine Management Systems



EDL8 Race Dash

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Before you start

Dash Manager Overview

All dash functions and settings are programmed using the Dash Manager. The settings are saved to the SD card while it is in the laptop SD card slot. The saved settings are then loaded into the race dash when you place the SD card into the SD Card slot of the dash and switch the dash on.

Before the SD card will work with the EDL8 race dash it must be initialised using the card initialization function of the Dash Manager software.

The SD card that came with the EDL8 Race dash is not usable until it is properly formatted for use with the Race Dash. The USB Flash drive that came in the kit has the EDL8 Data View software. This software must be installed on to a Windows laptop or PC.

To install the EDL8 Data View software.

Insert the USB Flash into a USB slot on the computer.

Open the USB Flash with Windows Explorer and run the EDL8Installer.exe file.

The installer will put the software on to the computer and also add the EDL8 Data View Icon on to the desktop.

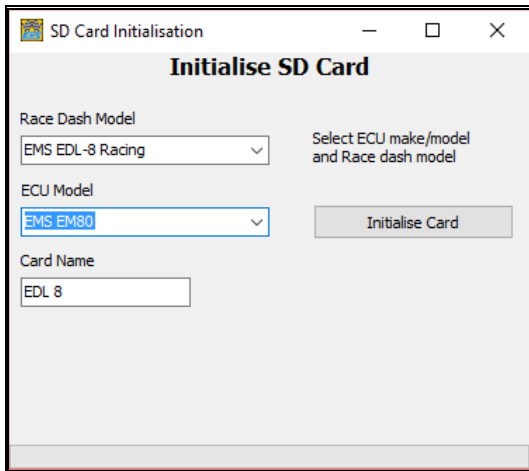
Double click the EDL8 Icon to start the software then:

Go to "Dash Manager -> EDL8" menu option.

Go to "SD Card -> Initialise new card". See next page on initialising the SD card.

Initializing an SD card

Once you have initialized the SD card for the EDL8 Race dash it will not be compatible with windows.



Initializing an SD card for the EDL8 race dash.

1. From the Dash Manager menu select “SD Card”->”Initialise new Card”. This will show the card initialisation screen.
2. Select a Race Dash model.
3. Select the ECU model used with this Race Dash.
4. Enter a card name in the field provided
5. Press the “Initialize Card” button.

The card name is important. The system will use this to group all extracted data logs together under the card name.

When the initialisation is complete the SD card will have a blank Dash Configuration. You can either load a pre-saved configuration file or set up a new configuration file with new screen layout, Display channels and Acquisition channels and also any required channel translations. If using the LED lights, PWM outputs or Pulse Inputs then these must also be configured.

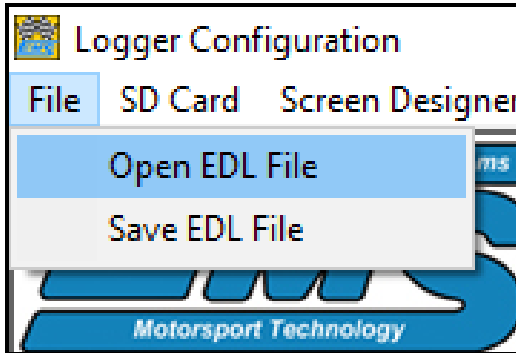
Once you have finished setting up the dash configuration it must be saved to the SD card and loaded in to the race dash.

To save the configuration file on to the SD card press the “Save to SD card” button at the top of the screen.

To load the settings from the SD card in to the dash, insert the card into the SD card slot on the dash and turn the dash on. The dash will indicate that it is loading the new settings by flashing the LED lights on the right hand side. Loading should take about 1 minute. Once loaded the dash will start operating with the new settings.

The EDL8 software comes with pre-saved configuration files for each of the EMS ECUs. After initializing the SD Card you can load a pre-saved configuration file and then adjust and change it to suit you requirements. Before loading a saved configuration file the SD card must be initialized.

Loading a pre-saved configuration



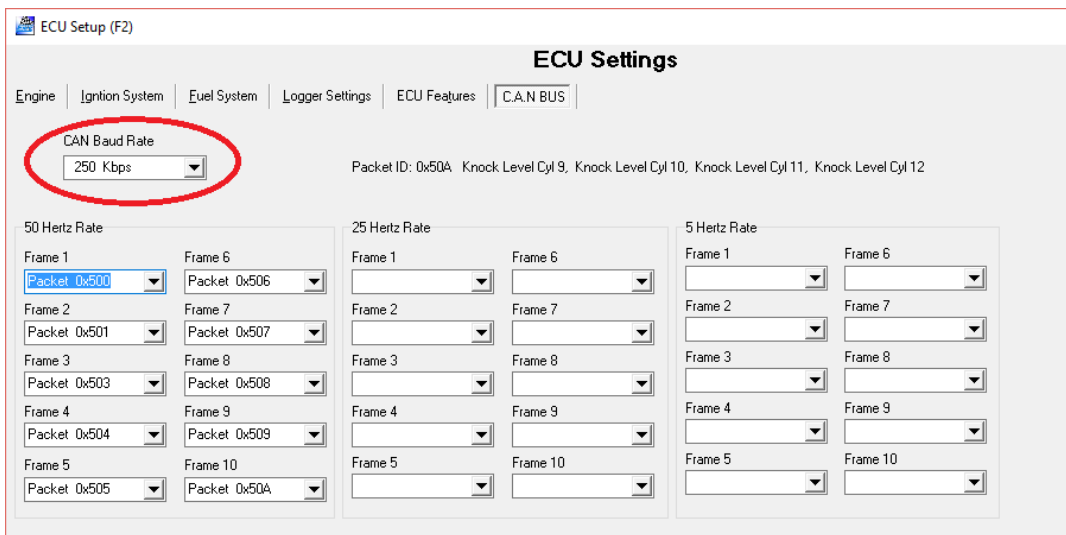
1. From the Dash Manager menu select “File”->”Open EDL File”. This will show a folder with pre-saved configuration files.
2. Select a file matching the ECU used with the Race Dash
3. Press the Open Button

This will load a pre-saved configuration file in to the Dash Manager Software. You can now customise this configuration to suit your specific needs and save it again or save it with a different name.

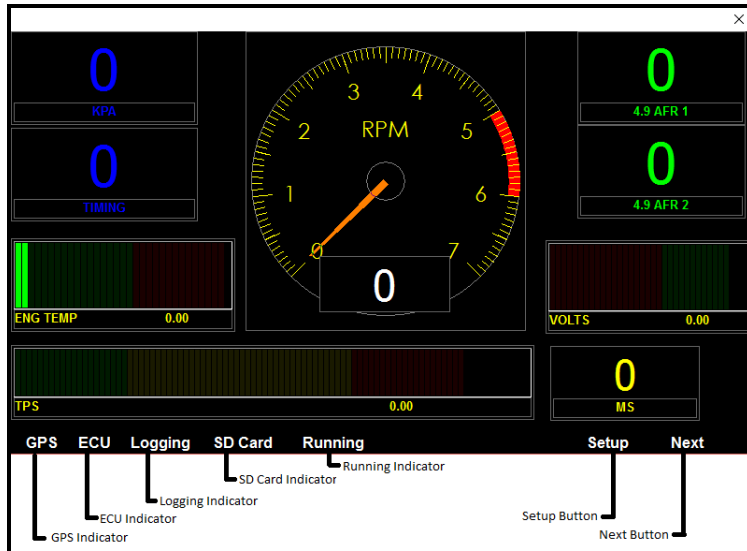
Connecting to EMS EM-Tech ECUs

The CAN data channels must be enabled on the EM-Tech ECU. This is done using the EM-Tech Manager Software.

While the ECU is connected to the laptop and communication with the EM-Tech Manager software go to the ECU setup screen and set the CAN Baud Rate to 250 Kbps and select the data packet for each frame.



Screen Functions



Please Note:

This is a demonstration screen layout.

Colours and gauges are fully customisable by using the screen designer. The borders around each gauge will not be visible on the EDL8 Race Dash.

GPS Indicator

This indicator will show yellow when a GPS module is connected and bright green when the GPS has locked onto the GPS satellites. The number of satellites is also shown

Logging Indicator

This indicator will show bright green when the EDL8 is saving data to the SD card memory.

ECU Indicator

This indicator will show bright green when the EDL8 is connected to an ECU

SD Card Indicator

This indicator will show bright green when a valid SD card is inserted in the Dash SD card slot.

Setup Button

When you have a mouse plugged in then you click on this button to display the setup screen. Use this screen to load new screen display firmware.

Next Button

When you have a mouse plugged in then you click on this button to display the secondary dash screen.

Logger Settings

Logger Settings	Channel Translations	LED Light Functions	PWM Outputs	Pulse Inputs
Log Activation		Timer		Screen Return Delay
Start / Stop Channel		Timer Resolution		Screen Delay Seconds
ECU Engine RPM		0.1		8
Start / Stop Trigger		Timer Start Channel		
Greater or Equal		ECU Engine RPM		
Start Trigger Value	Stop Trigger Value	Start Trigger	Trigger Value	
2000.00	1500.00	Greater Than	1500	
Start/Stop Delay		Timer Stop Channel		
1		ECU Engine RPM		
Logging Hertz		Stop Trigger	Trigger Value	
100 Hertz		Less Than	1500	

Log Activation

This is used to select how the logger will start and stop logging. The logger can be set to start logging whenever the selected channel data is higher than the Start Trigger Value. The logging will stop when the selected channel value is below the Stop Trigger value.

Start / Stop Channel

Set the channel used to start and stop the logging.

Start / Stop Trigger

This tells the logger how to compare the start / stop channel. It will either compare if the channel is more than or less than the trigger value.

Start Trigger Value

This is the value used to compare the start/stop channel value. If Start/Stop Trigger is set to **greater than**, then the logger will commence logging when the data channel value is higher than the trigger value. If Start/Stop Trigger is set to **Less than**, then the logger will commence logging when the data channel value is lower than the trigger value.

Stop Trigger Value

This is the value used to compare the start/stop channel value. If Start/Stop Trigger is set to **greater than**, then the logger will stop logging when the data channel value is lower than the trigger value. If Start/Stop Trigger is set to **Less than**, then the logger will stop logging when the data channel value is higher than the trigger value.

Start/Stop Delay

This tells the logger how long to wait before logging commences and stops. This time is represented in milliseconds.

Example: To commence logging when the RPM is higher than 2000 for 300 milliseconds and stop logging when the RPM is less than 1500 RPM for 300 milliseconds.

- Set the Start/Stop Channel to "ECU Engine RPM"
- Set the Start/Stop Trigger to "Greater or Equal"
- Set the Start Trigger value to "2000"
- Set the Stop Trigger value to "1500"
- Set the logging Start/Stop delay to 300

Log Packets per second

A log packet contains all of the data channels selected to log. This can be from 1 channel up to 40 channels.

Use this to set the number of logs packets per second. If you set it to "200" then the logger will record every channel 200 times per second. Set it to 100 to log every channel 100 times per second.

Timer

This can be used to count time. It counts time in seconds and milliseconds. The timer resolution can be set to "OFF", 10mS or 1mS. Each time the timer is stopped the time counters are reset back to zero (0).

Timer Resolution

Setting this to "OFF" will disable the timer. Setting it to 1mS will set the timer resolution to every 1 millisecond. Setting to 10mS will set the timer resolution to 10 milliseconds.

Start Timer Channel

Set the channel you want to use to start the timer.

Start Trigger

This tells the timer how to compare start channel. When set to **greater than**, then the timer will commence when the channel value is higher than the trigger value. When set to **less than** then the timer commence when the channel value is lower than the trigger value.

Trigger Value

This is the value used to compare the start channel value.

Stop Timer Channel

Set the channel used to stop the timer.

Stop Trigger

This tells the timer how to compare stop channel. When set to **greater than**, then the timer will stop when the channel value is higher than the trigger value. When set to **less than** then the timer stop when the channel value is lower than the trigger value.

Trigger Value

This is the value used to compare the stop channel value.

Example: If you want to start the timer when the Engine RPM is more than 1500 and stop it when the engine RPM is lower than 1500 and have a timer resolution of 1 millisecond.

- Set Timer resolution to "1mS"
- Set Start Timer Channel to "ECU Engine RPM"
- Set Start Trigger to "Greater than"
- Set Trigger Value to 1500
- Set Stop Timer Channel to "ECU Engine RPM"
- Set Stop Trigger to "Less Than"
- Set Trigger Value to 1500

Screen Return Delay

The second screen can be momentarily displayed by switching switch input 1 to ground. This can set the delay before the dash reverts back to the main screen.

Screen Delay Seconds

Set the delay in seconds before the momentary screen returns back to the main screen.

Example: To display the momentary second screen for 8 seconds after pressing the switch then set this value to 8.

GPS Active

If you have a GPS module and want to record speed and track mapping then this must be set to "Activated"

Lap Timer

The "minimum lap time in seconds" parameter is used identify sector beacons from lap beacons. If the lap time reading is less than the minimum lap time then the dash will assume the beacon signal to be a sector.

Set this value to a time that is less than your fastest lap time but more than the last sector time.

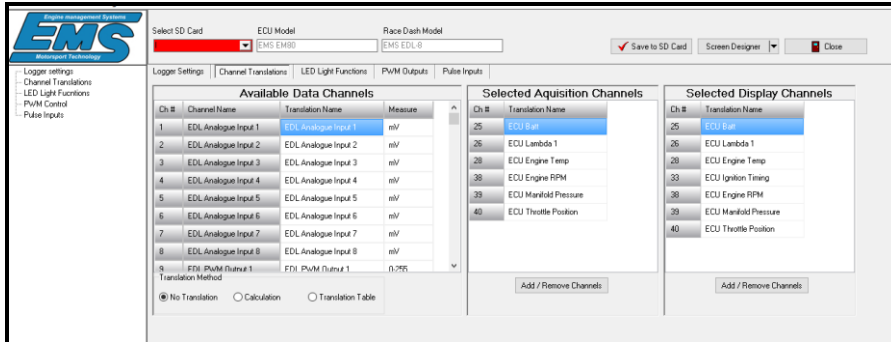
Set Date and Time

The Dash has a built-in clock that runs off a small battery when power is off. Once the battery is discharged the time is lost and must be reset.

Resetting the date and time on dash is done via the SD card. Set the correct date and time in the fields provided and then tick the "Set Dash Time on settings upload". The time clock will be reset once you put the SD card into the dash and turn the dash on.

Channel Translation

Data can come from the dedicated Race Dash channel inputs and ECU channel inputs. In both cases data may need to be translated into an engineering unit of measure or translated from one measure to another. You may also want to change channel names to something more meaningful to you. All saved data logs will use the translated channel values and new channel names.



This screen has multiple functions.

1. Change the value of a channel to a different value by applying a calculation formula or translation table.
2. Change the default channel name and unit of measure.
3. Select data channels to record during a log.
4. Select data channels to display on the dash screen.

The main purpose for using a translation formula or translation table is to change the default unit of measure of any channel value. Use this feature to translate voltage to PSI, Celsius to Fahrenheit, KPA to PSI or any other unit of measure.

Example: EMS ECUs transmit manifold pressure in KPA but PSI may be preferred. A formula or translation table can be used to convert KPA to PSI.

Changing the default channel name

The default channel names can be changed directly within the Available Data Channels list box. Click twice (not double click) in the channel name and type the new name. This new name will now appear in the all drop down list boxes and saved in the data log files.

Changing the default measure

The measure field is only informational and does not affect the data logging or other parts of the system. Change this field if a formula is applied to a data channel that changes its default data measurement. Click twice in the measure and type the new measure.

Example 1: If you set a formula for the ECU Manifold Pressure channel to convert it from KPA to PSI then you can change the measure to PSI.

Example 2: If a temperature sensor is connected to an EDL Analogue input channel and a translation table to is defined to translate voltage into temperature.

Translating a channel value

Ch #	Channel Name	Translation Name	Measure
33	ECU Ignition Timing	ECU Ignition Timing	0.01Deg
34	ECU PWM Output 1	ECU PWM Output 1	0-255
35	ECU PWM Output 2	ECU PWM Output 2	0-255
36	ECU PWM Output 3	ECU PWM Output 3	0-255
37	ECU PWM Output 4	ECU PWM Output 4	0-255
38	ECU Engine RPM	ECU Engine RPM	
39	ECU Manifold Pressure	ECU Manifold Pressure	KPA
40	ECU Throttle Position	ECU Throttle Position	%
41	ECU Injector Duty	ECU Injector Duty	0.001mS

Translation Method

No Translation
 Calculation
 Translation Table

Operation

Channel multiplied by value

Value

0.15

Applying a translation formula

Select the channel to define from the Available Channels list. Click “Calculation” in the Translation Method selector box. This will show the formula definition screen.

There are four calculation formulas you can use to translate data into a different value.

1. Channel plus value
2. Channel minus value
3. Channel multiply by value
4. Channel divided by value

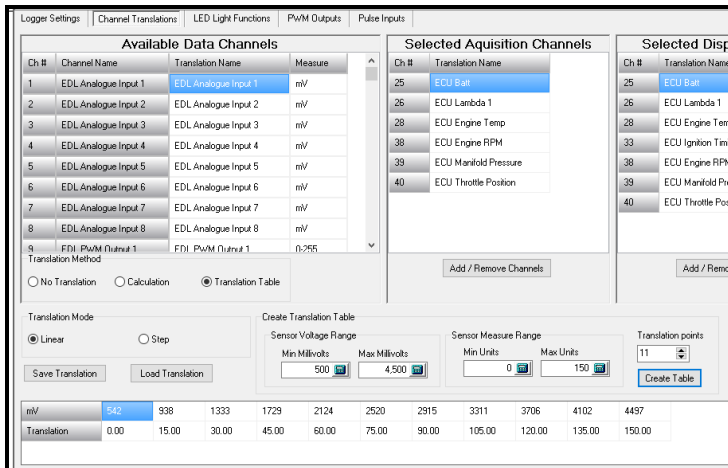
Each one of these will use the default channel data and apply one of the formulas with the value entered into the value field.

Example: Translate the ECU Manifold Pressure channel from KPA to PSI.

1. Scroll to the “ECU Manifold Pressure” channel in the available channels list.
2. Click “Calculation” in the Translation Method box.
3. Select “Channel multiplied by value” in the Operation selection drop-down.
4. Type “0.147” into the Value field.

The logger will now multiply the default value by 0.147 to convert it to PSI.

Applying a Translation Table



Use this method of translation for channels that need a complicated formula or have a non-linear coefficient.

Select the channel to translate from the Available Channels list. Click “Translation Table” in the Translation Method selector box. This will show the translation table definition screen.

There are 2 translation modes you can select from, Linear or Step.

Linear mode is used to define a table for a sensor that does not have a linear coefficient. You can define up to 11 translation points and enter a translation value for each point. The Race Dash will perform a linear extrapolation between each point to calculate an accurate data value.

Step mode is used to define a table with up to 11 translation points. But instead of performing an extrapolation between each point to calculate an exact value it will use the entered value directly. This is useful if you are using a voltage to determine the selected gear.

To create a translation table you need 3 parameters, the number of translation points, the sensor voltage range and the sensor unit of measure range. The number of translation points should be kept to a minimum. If the sensor is linear then you only need 3 – 5 translation points. If the sensor is non-linear then you can use up to 11 translation points.

Example: To create a translation table for a sensor that is rated to produce a voltage from 500 mV (0.5V) to 4500 mV (4.5V) and gives a PSI unit of measure from 0 to 150 PSI. First, enter 500 in the “**Min Millivolts**” field, enter 4500 in the “**Max Millivolts**” field, enter 0 (zero) in the “**Min Units**”, enter 150 in the “**Max Units**”, Enter 5 in the “**Translation points**” field and press the “**Create Table**” button. For a non-linear sensor you can use this method to create an initial table to start with then adjust the “**Translation Value**” row of values according to the sensor’s ratings. The EDL-8 Race Dash will interpolate between translation points to produce a smooth gauge reading and data log value.

Linear translation

This method of translation interpolates between translation points to produce a linear value.

Step translation

This method of translation does not interpolate between translation points. It looks for the first value point that is less than the data channel value and uses the value in the particular translation point. This is useful for displaying a gear number if you are using a variable voltage to indicate the currently selected gear.

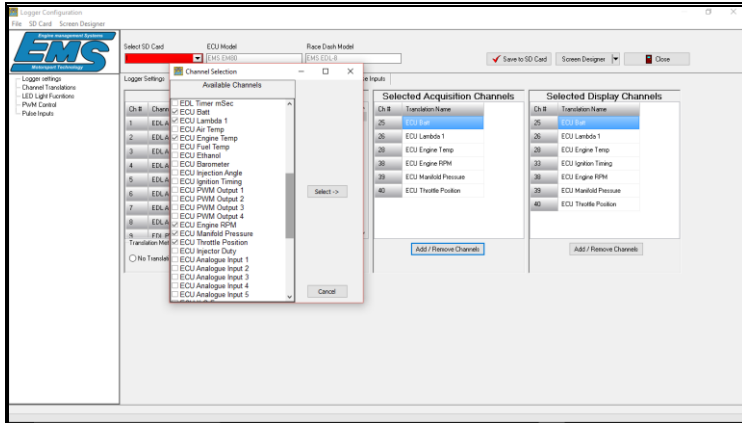
Loading and Saving Translation Tables

Once a translation table has been defined for a particular sensor it can be saved and reload for another channel.

To save the table press the “Save Translation” button. This will display the Save screen where you can leave the default folder location or select a different one. Enter a file name for the table and press the “Save” button to save the new file.

To load a saved translation table press the “Load Translation” button. This will show the open screen. Select the table needed and press the “Open” button.

Select Channels to log

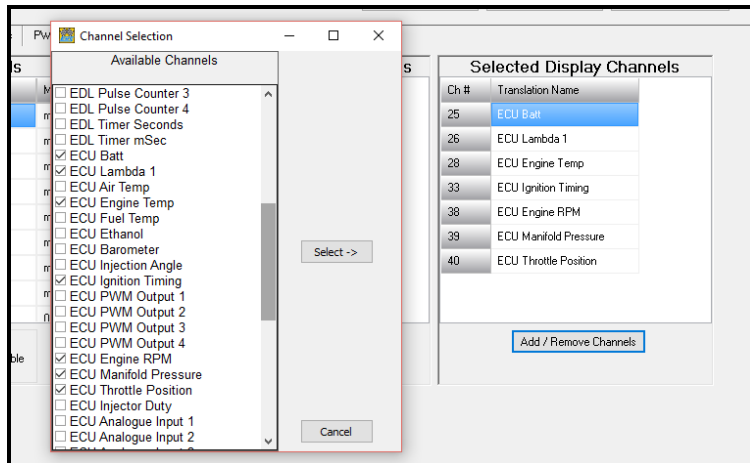


Up to 40 channels can be selected for logging from the list of available channels. To select the channels for logging press the “Add / Remove Channels” button that is directly under the “Selected Acquisition Channels” to show the channel selection screen.

Each available channel has a selection tick box beside the channel name. Select the required channel by clicking on the tick box next to the channel name, a selection tick will appear in the small box. Repeat this for each channel you want to record. Once all required channels are selected press the “Select ->” button.

To remove a selected channel press the “Add / Remove Channels” to display the channel selection box. Click on the tick box beside the channel name you want to remove, this will remove the selection tick. Repeat this for each channel you want to remove then press the “Select ->” button.

Select Channels to Display



You can select up to 20 channels to display from the list of available channels. To select the channels you want to use on the dash display press the “Add / Remove Channels” button that is directly under the “Selected Display Channels” to show the channel selection screen.

Each available channel has a selection tick box beside the channel name. You select the channel you want to display by clicking on the tick box to show a selection tick. Repeat this for each channel you want to display. Once you have selected all the channels you want press the “Select ->” button.

To remove selected channels press the “Add / Remove Channels” button to display the channel selection box. Click on the tick box beside the channel name you want to remove, this will remove the selection tick. Repeat this for each channel you want to remove then press the “Select ->” button.

All of the channels selected will become selectable in the Screen designer windows.

NOTE: If you have added or removed display channels then you must reset the channel for each gauge via the screen designer.

LED Light Functions

The EDL8 Dash Logger has 8 LED lights. These LED lights can be used as shift lights or warning lights. Each light can have different 5 configurations and be linked to a different data channel for each configuration.

The LED light configuration is activated according the value of the “Config Selection Channel”. When the “Config Selection Channel” is set to “Default” then only the Main Configuration is active.

Logger Settings Channel Translations LED Light Functions PWM Outputs Pulse Inputs				
Main Configuration Configuration 2 Configuration 3 Configuration 4 Configuration 5				
	Trigger Channel	Activation Trigger	Trigger Value	LED Action
LED Light 1 - Left Most	ECU Engine RPM	Greater Than (>)	4000.00	LED On
LED Light 2	ECU Engine RPM	Greater Than (>)	4500.00	LED On
LED Light 3	ECU Engine RPM	Greater Than (>)	5000.00	LED On
LED Light 4 (Red)	ECU Engine RPM	Greater Than (>)	5500.00	LED On
LED Light 5 (Red)	ECU Engine RPM	Greater Than (>)	5500.00	LED On
LED Light 6	ECU Engine RPM	Greater Than (>)	5000.00	LED On
LED Light 7	ECU Engine RPM	Greater Than (>)	4500.00	LED On
LED Light 8 - Right Most	ECU Engine RPM	Greater Than (>)	4000.00	LED On
LED Config Selection Channel				
	Default	Less Than (<)	2.00	

Programming an LED light to turn on

Each LED is numbered from 1 to 8 starting from the left most LED. Each one can be linked to a different channel or all LED lights can be linked to the same channel.

Trigger Channel

This links each LED to a channel. Select the desired channel from the dropdown box.

Activation Trigger

This tells the dash how to compare the channel value with the trigger value. Use this to select when to activate the LED. Select “Greater than” if you want to activate the LED whenever the channel value is higher than the trigger value. Select “Less than” if you want to activate the LED whenever the channel value is lower than the trigger value.

Trigger Value

The dash logger compares the channel value with this value to activate the LED light.

LED Action

Use this to program the LED to either turn on or stay off.

Activating different LED configurations

The EDL8 dash logger can have up to 5 LED light configurations. This is useful if you need set multiple functions for the LED lights.

For example when using the LEDs as shift lights, you can set different set points based gear number.

Main Configuration

The screenshot shows the 'Main Configuration' tab selected. It displays a table for LED configurations:

LED Channel	Trigger Channel	LED Activation Trigger	Trigger Value	LED Action
LED Light 1 - Left Most	ECU Engine RPM	Greater Than (>)	4000	LED On
LED Light 2	ECU Engine RPM	Greater Than (>)	4500	LED On
LED Light 3	ECU Engine RPM	Greater Than (>)	5000	LED On
LED Light 4 (Red)	ECU Engine RPM	Greater Than (>)	5500	LED On
LED Light 5 (Red)	ECU Engine RPM	Greater Than (>)	5500	LED On
LED Light 6	ECU Engine RPM	Greater Than (>)	5000	LED On
LED Light 7	ECU Engine RPM	Greater Than (>)	4500	LED On
LED Light 8 - Right Most	ECU Engine RPM	Greater Than (>)	4000	LED On

Below the table, there are settings for 'LED Config Selection Channel' (Gear Number) and 'Config Activation Trigger' (Less Than (<)) with a 'Config Trigger Value' of 2.

In this configuration the LED lights will progressively turn on starting at 4000 RPM. LED 1 and 8 will turn on first, then LED 2 & 7, then 3 & 6 and last LED 4 & 5.

Configuration 2

The screenshot shows the 'Configuration 2' tab selected. The table is similar to the main configuration but with different trigger values:

LED Channel	Trigger Channel	LED Activation Trigger	LED Trigger Value	LED Action
LED Light 1 - Left Most	ECU Engine RPM	Greater Than (>)	4500	LED On
LED Light 2	ECU Engine RPM	Greater Than (>)	4000	LED On
LED Light 3	ECU Engine RPM	Greater Than (>)	5300	LED On
LED Light 4	ECU Engine RPM	Greater Than (>)	5600	LED On
LED Light 5	ECU Engine RPM	Greater Than (>)	5600	LED On
LED Light 6	ECU Engine RPM	Greater Than (>)	5300	LED On
LED Light 7	ECU Engine RPM	Greater Than (>)	4000	LED On
LED Light 8 - Right Most	ECU Engine RPM	Greater Than (>)	4500	LED On

The 'Config Trigger Value' is set to 3.

In this configuration the LED lights will progressively turn on starting at 4500 RPM. LED 1 and 8 will turn on first, then LED 2 & 7, then 3 & 6 and last LED 4 & 5.

Configuration 3

The screenshot shows the 'Configuration 3' tab selected. The table is similar to the main configuration but with different trigger values:

LED Channel	Trigger Channel	LED Activation Trigger	LED Trigger Value	LED Action
LED Light 1 - Left Most	ECU Engine RPM	Greater Than (>)	4300	LED On
LED Light 2	ECU Engine RPM	Greater Than (>)	5000	LED On
LED Light 3	ECU Engine RPM	Greater Than (>)	5700	LED On
LED Light 4	ECU Engine RPM	Greater Than (>)	6400	LED On
LED Light 5	ECU Engine RPM	Greater Than (>)	5600	LED On
LED Light 6	ECU Engine RPM	Greater Than (>)	5700	LED On
LED Light 7	ECU Engine RPM	Greater Than (>)	5000	LED On
LED Light 8 - Right Most	ECU Engine RPM	Greater Than (>)	4300	LED On

The 'Config Trigger Value' is set to 4.

In this configuration the LED lights will progressively turn on starting at 4300 RPM. LED 1 and 8 will turn on first, then LED 2 & 7, then 3 & 6 and last LED 4 & 5.

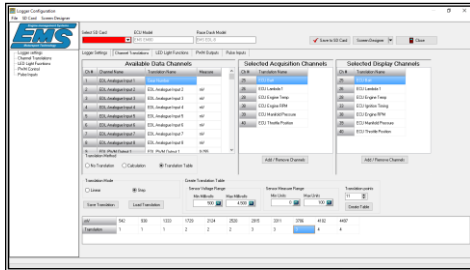
The above images demonstrate how the LEDs are set to function as shift lights with a different LED configuration for each gear.

The main configuration image shows the set points for gear 1, configuration 2 shows the set points for gear 2 and configuration 3 shows the set points for gear 3.

How to set up shift lights

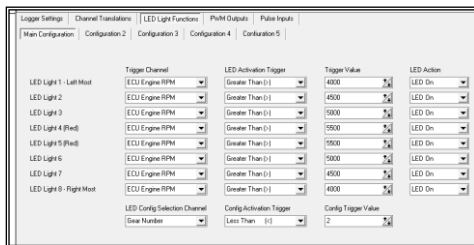
Follow the steps below to set up a different shift point for each gear.

Step 1. Select an analogue input to function as a gear indicator.



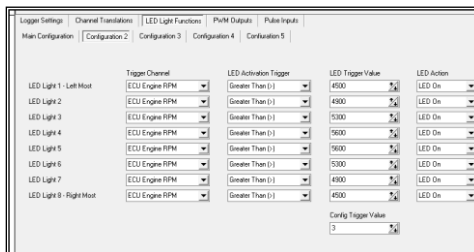
This screen shows how EDL Analogue Input 1 is set to indicate gear number based on channel voltage. You can also see that channel name is changed to “Gear Number”.

Step 2. Set the configuration for each gear.

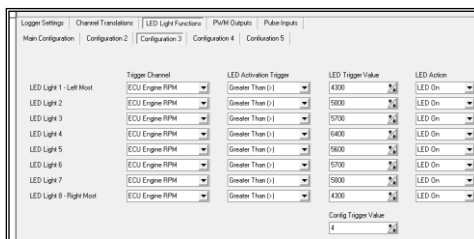


This screen shows how the the LED configuration will be selected according to the “Gear Number” channel.

The Main Configuration will be used whenever the Gear number is 1. The “LED Configuration Selection Channel” is set to “Gear Number”, The Config Activation Trigger is set to “Less Than” and trigger value is set to “2”.



This screen shows how Configuration 2 is used whenever the Gear number is 2. In this screen shot you will see that the Config Trigger value is set to “3”. This is because we set the Config Activation Trigger as “Less Than”



This screen shows how Configuration 3 is used whenever the Gear number is 3. In this screen shot you will see that the Config Trigger value is set to “4”

PWM Outputs

The EDL8 has 4 pulse width modulated outputs. These can be used to control devices like boost control valves, thermo fans, etc. Each PWM output signal can be varied from 0 to 100 percent in 255 increments. Each output must be linked to an input data channel and a table must be defined to control the PWM duty.

Operation Mode

This parameter sets how the EDL8 will use the control table. When set to Linear Look up mode the EDL8 will interpolate between set points to give a linear PWM duty modulation. When set to Step Look up mode then there is no interpolation and the PWM output modulation is stepped.

Look up Channel

This is the channel that is linked to the PWM output. The EDL8 will use data values from this channel to look up the correct PWM Duty from the PWM modulation table.

PWM Frequency

This will set the frequency of the PWM output signal. This value will depend the PWM device being controlled. A good starting point will be around 40Hz.

Although the EDL8 has 4 PWM outputs the frequency setting values are shared. PWM output 1 and 2 share the frequency setting for output 1. PWM outputs 3 and 4 share the frequency setting for output 3. However, the modulation tables are completely separate for each output.

Reverse Action

This setting controls the polarity of the PWM output signal. In "Normal" mode the output voltage is high for the duration of the "ON" duty cycle and in "Reverse" mode the output voltage is low during the "ON" duty cycle.

Output Modulation Table

This table controls the PWM output duty. It has 2 rows that must be defined. The "Look up Value" row and the "PWM Duty" row. The EDL8 will read the data value of the "Look up Channel" and use it to find which PWM duty to set the output.

PWM output example

Logger Settings | Channel Translations | LED Light Functions | PWM Outputs | Pulse Inputs

PWM Output 1 | PWM Output 2 | PWM Output 3 | PWM Output 4

Operation Mode: Linear Look up | PWM Frequency: 30 Hz
 Look up Channel: ECU Ethanol | Reverse Action: Normal

Output Modulation Table

Look up Value	0	10	20	30	40	50	60	70	80	90	100
PWM Duty	200	170	120	90	80	70	60	50	40	30	20

This example demonstrates how to set up PWM output 1 to operate as a variable boost controller based on ethanol content. The EDL8 will look up and find what PWM duty to use at different ethanol percentages. It will find the first point that is less than or equal to the channel data value.

Please note that these settings will not work. They are only intended to be an example.

1. Set Operation Mode to “Linear Look up”
2. Set Look up Channel to “ECU Ethanol”
3. Set PWM Frequency to “30Hz”
4. Set each ethanol content look up value in the Output Modulation Table
5. Set each PWM duty value for each of the ethanol content values

Pulse Inputs

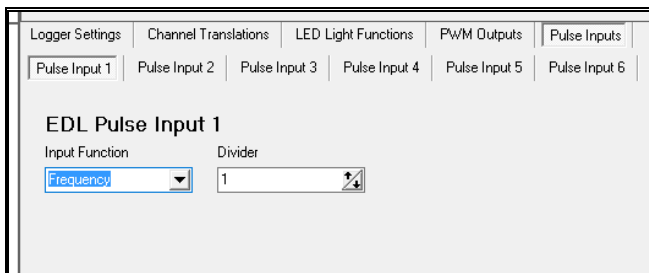
The EDL8 has 6 pulse inputs. These can be used to measure frequency, revs per minute and wheel speed. The first 4 inputs can also record distance travelled when set as speed inputs.

Input Function

Use this dropdown box to select the function of the particular pulse input. The possible selections are Frequency, RPM and Speed. Different parameters will become active depending on which function was chosen.

Frequency

This has only the divider parameter. This would normally be set to 1.



RPM

The only parameter available for this function is Pulses per Revolution. You would set this if the pulse sensor counts more than 1 pulse per one full revolution.

Example: If you want to measure tail shaft revolutions per minute and the tail shaft has 4 equally spaced teeth then you need to set the pulses per revolution to 4.

Logger Settings | Channel Translations | LED Light Functions | PWM Outputs | Pulse Inputs

Pulse Input 1 | Pulse Input 2 | Pulse Input 3 | Pulse Input 4 | Pulse Input 5 | Pulse Input 6

EDL Pulse Input 1

Input Function: RPM
Pulses per revolution: 4

Speed

This function has 3 parameters, Pulses per revolution, Distance travelled in one revolution and Measure for recording distance.

Logger Settings | Channel Translations | LED Light Functions | PWM Outputs | Pulse Inputs

Pulse Input 1 | Pulse Input 2 | Pulse Input 3 | Pulse Input 4 | Pulse Input 5 | Pulse Input 6

EDL Pulse Input 1

Input Function: Speed
Pulses per revolution: 1
Wheel Circumference in centimeters: 200
Distance measure: Centimeters

Pulses per revolution.

If the speed sensor is reading directly off the wheel axle then set this to the number of pulses the sensor will produce per one full wheel revolution.

If the speed sensor is reading off the tail shaft then you must also consider the differential ratio.

Example: If the sensor is reading a 4 tooth pulse wheel on the wheel axle then the sensor will produce 4 pulses per each wheel revolution. In this case you must put 4 in the pulses per revolution parameter and the wheel circumference (in centimetres) in the Distance travelled in one revolution.

If the sensor is reading 4 pulses from the tail shaft then you must still put 4 pulses per revolution but now instead of using the wheel circumference directly you must divide the circumference by the differential ratio.

Distance travelled in one revolution in centimetres

Enter the wheel circumference in centimetres. The Dash will use this to calculate speed. Speed is calculated in centimetres per second. To convert centimetres per second in to KPH then use the channel translation for the respective pulse input channel.

Please Note:

If the pulses are measured from the tail shaft then measure the wheel travel for one tail shaft revolution in centimetres and use this value in place of wheel circumference.

Calculate wheel speed

The EDL8 race dash calculates speed in centimetres per second. This needs to be translated into Kilometres per hour.

Example:

Wheel circumference = 200 cm

Wheel revolutions per second = 10

If the wheel is turning 10 revolutions per second then the distance per second is 200 cm multiplied by 10. This is 2000 cm per second, multiply this value by 0.036 to convert this to KPH.

Long Explanation.

$10\text{Hz} \times 200\text{cm} = 2000\text{cm per second}$

$2000\text{cm per second} \times 60 \text{ seconds} = 120000 \text{ cm per minute}$

$120000 \text{ cm per minute} \times 60 \text{ minutes} = 7200000 \text{ cm per hour}$

$7200000 \text{ cm per hour} / 100 \text{ cm} = 72000 \text{ meters per hour}$

$72000 \text{ meter per hour} / 1000 \text{ meters} = 72 \text{ KPH}$

Short explanation

$2000 \times 0.036 = 72 \text{ kilometres per hour}$

Setting the channel translation to show kilometres per hour.

1. Go to the channel translation screen and select the respective pulse input channel.
2. Select "Calculation" in the translation method selection box
3. Set Operation to "Channel Multiplied by Value"
4. Set Value to "0.036"

This will convert the pulse input channel value from cm per second to kilometres per hour.

Measure for recording distance

The Dash can also calculate distance travelled in either meters or centimetres. Use this parameter to set the distance measurement.

Please note that there is a maximum distance limit that the dash can record.

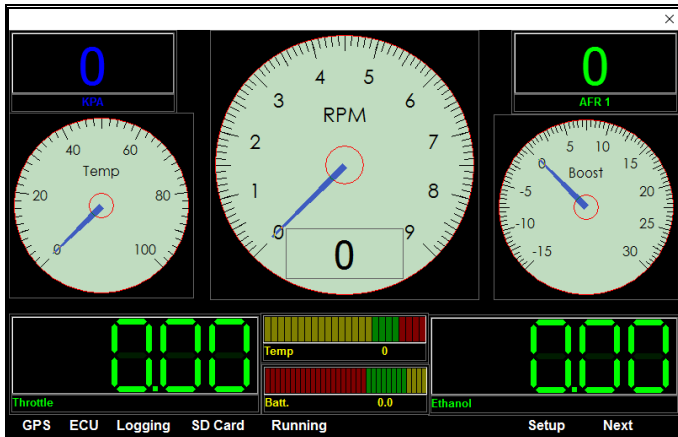
If distance measure is set to “Meters” then the maximum is 65,535 meters.

If distance measure is set to “Centimetres” then the maximum distance is 655.35 meters. (65535 centimetres)

The screenshot shows a software interface for configuring pulse inputs. At the top, there are several tabs: "Logger Settings", "Channel Translations", "LED Light Functions", "PWM Outputs", and "Pulse Inputs". The "Pulse Inputs" tab is active, and within it, "Pulse Input 1" is selected. Below the tabs, the title "EDL Pulse Input 1" is displayed. There are three input fields: "Input Function" is a dropdown menu set to "Speed"; "Pulses per revolution" is a numeric spinner set to "4"; and "Wheel Circumference in centimeters" is a numeric spinner set to "188". Below these fields, there is a "Distance measure" dropdown menu set to "Meters".

Screen Designer

Use this feature to design the Race Dash screens. Any changes made with screen designer are saved to the SD Card and will become active once the SD card is inserted into the Race Dash and the dash is turned on. The EDL8 race dash can display 2 screens, the main screen and a secondary screen. The second screen is activated via an input switch. It is a momentary screen that remains active for a defined period then the main screen becomes active again. See "Screen Return Delay" to define the delay period.



Adding Gauges to the Dash Screens

To add new gauges place the mouse pointer on an area of the screen that is clear of any gauge and press the right mouse button. A pop-up menu will be shown allowing for the selection of various gauges. Select the desired gauge from the pop-up menu. You can now resize and position by clicking and dragging with the mouse pointer.

Repositioning and resizing Gauges

You can reposition and resize any gauge by placing the mouse pointer on the gauge you want to modify and press the right mouse button and select the Move/Resize/Lock option. This will show a window border around the gauge. Use the top border to drag and reposition the gauge. Click and drag the side borders to resize the gauge. To lock the gauge position and size press the right mouse button again and select the Move/Resize/Lock option.

Removing Gauges

To remove a gauge place the mouse pointer on the gauge you want to remove and press the right mouse button and select the Remove Gauge option.

Clearing the designer screen

If you need to clear the entire screen then press the right mouse button on an area of the screen that is clear of any gauge and select the "Clear Screen" option from the pop-up menu.

Loading a pre-save screen

You can load a pre-saved screen from a different configuration file.

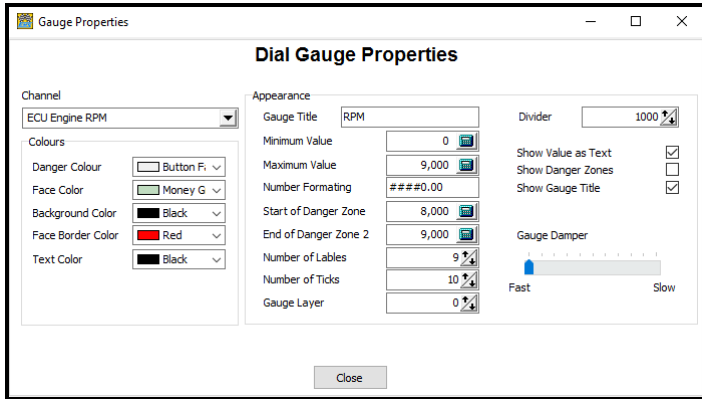
Press the right mouse button on an area of the screen that is clear of any gauge and select the "Load Screen" option from the pop-up menu. A selection window showing available pre-saved files. Select the desired file and press the "Open" button.

This will load only the screen layout from the file and you must re-set the channel for each gauge.

Setting Gauge Properties

To set gauge properties such as Title, Colour and data channel place the mouse pointer on the gauge and press the right mouse button. Select Gauge Properties option from the popup menu to show the property screen for the selected gauge.

Dial gauge



Channel

Select the data channel you want displayed on this gauge. If there are no channels to select then you have not selected any channels to display. See “Select Channels to Display”

Minimum Value and Maximum Value

These values set the minimum and maximum number span for the gauge.

IE if this gauge is used to show Engine RPM and you want the gauge limit to be 7000 RPM, then you will set the max value to 7000, min value to 0.

Number formatting

This describes the numerical formatting for text values.

= Do not show leading zeros.

0 = Show leading zeros

. = Decimal place

This format “##0.00” will show numbers with 3 significant digits and 2 decimal digits. The “#” symbols will only show numbers that are greater than zero.

Start and End Danger Zone

These numbers determine where to start and stop the danger zone for the gauge. If you want to show an RPM danger zone from 5500 RPM to 7000 RPM, then set max danger zone to 7000 and min danger zone to 5500.

Divider

This allows you to show the full value in the text but a divided value on the gauge. This is useful when displaying RPM. If you want to show RPM in thousands (1 = 1000, 5 = 5000) then you set the divider to 1000.

IE: If you want the gauge to show a maximum of 8 for 8000 RPM then you would set the gauge parameters Max Value to 8000 and the divider to 1000. This will draw a gauge with numbers from 0 to 8 that represent 0 to 8000 RPM.

Number of Labels

This number of major marks visible on the gauge. Set this value to a number that divides evenly into the gauge span. This will provide an even range of numbers around the gauge.

To calculate the gauge span then subtract the gauge minimum from the gauge maximum. IE: if the gauge is used to show manifold pressure in KPA from -100 to +100 KPA then the gauge span is $+100 - -100 = 200$.

Number of Ticks

Set this number to a value that the Number of Marks can divide evenly into. This will give you an even number of small ticks between each mark.

Gauge Title

The text displayed on each gauge depends on the channel selected. This is set when you define the channel translation table. The gauge will display the Translation name and Unit of Measure (UOM) defined using the EDL7 Dash Manager option found in the Analysis Software.

Layer Order

This controls whether a gauge is shown on top of another. A gauge with a higher number is shown on top of a gauge with a lower number. This allows you place gauges in positions that partly obscure another gauge.

Danger Colour

This allows you to choose the colour you want to display in the danger zone.

Face Colour

This is the colour for the round dial background colour.

Face Border Colour

This is the colour around the edge of the dial face.

Background Colour

This is the colour for the area of gauge outside of the round dial face.

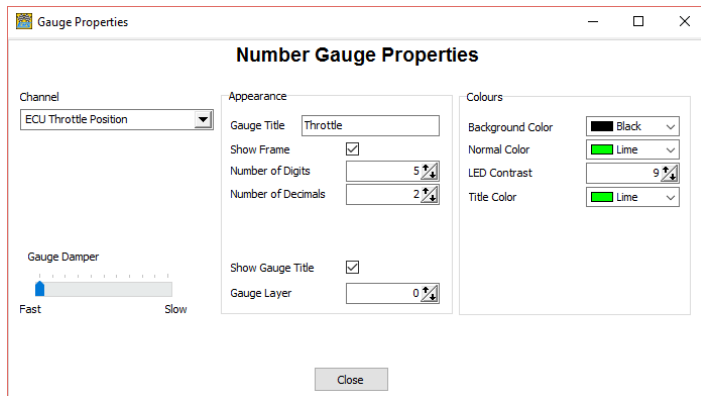
Text Colour

This is the colour of the text and ticks of the gauge.

Show Danger Zone

Tick this field if you want to show the danger zone.

Segment Gauge



Data Channel

Select the data channel you want displayed on this gauge. If there are no channels to select then you have not selected any channels to display. See “Select Channels to Display”

Gauge Title

The title text displayed on each gauge. If this is left blank then the channel name will be displayed

Number of digits

This refers to the total number of digits the gauge will show. Set this to a value that can accommodate the maximum value of the channel including the number of decimals. EG: If the data value is 120.34 then you would set then number of digits to 5 and number of decimals to 2.

Number of Decimals

This refers to the precision of the value being shown. If you only want to show whole numbers then set it to zero. If you want an accuracy of 100ths then set this value to 2.

Show Frame

If you want a frame around the gauge tick this field.

Layer Order

This controls whether a gauge is shown on top of another. A gauge with a higher number is show on top of a gauge with a lower number. This allows you place gauges in positions that partly obscure another gauge.

Normal Colour

The gauge will be displayed in this colour.

LED Contrast

This sets the brightness difference between LEDs that are on and those that are off.

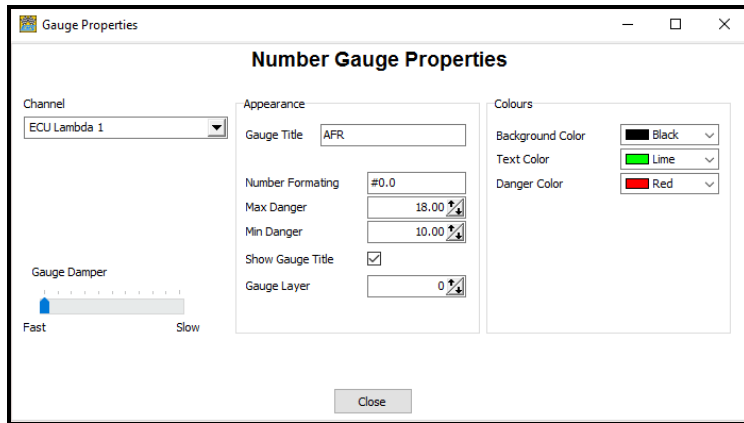
Background Colour

This is the colour for the area behind the displayed value.

Show gauge tile

Tick this field if you want to show the gauge title.

Text Gauge



Data Channel

Select the data channel you want displayed on this gauge. If there are no channels to select then you have not selected any channels to display. See “Select Channels to Display”

Gauge Title

The title text displayed on each gauge. If this is left blank then the channel name will be displayed

Layer Order

This controls whether a gauge is shown on top of another. A gauge with a higher number is shown on top of a gauge with a lower number. This allows you place gauges in positions that partly obscure another gauge.

Max Danger

This allows you to display a different colour whenever the channel value higher than this value.

Min Danger

This allows you to display a different colour whenever the channel value lower than this value.

Number formatting

This describes the numerical formatting for text values.

= Do not show leading zeros.

0 = Show leading zeros

. = Decimal place

This format “##0.00” will show numbers with 3 significant digits and decimal digits. The “#” symbols will only show numbers that are greater than zero

Danger Colour

The gauge will change to the selected colour when its data channel value is not within the Min and Max danger range.

Normal Text Colour

The gauge will displayed in this colour when its value is below the danger limit.

Background Colour

This is the colour for the area behind the displayed value.

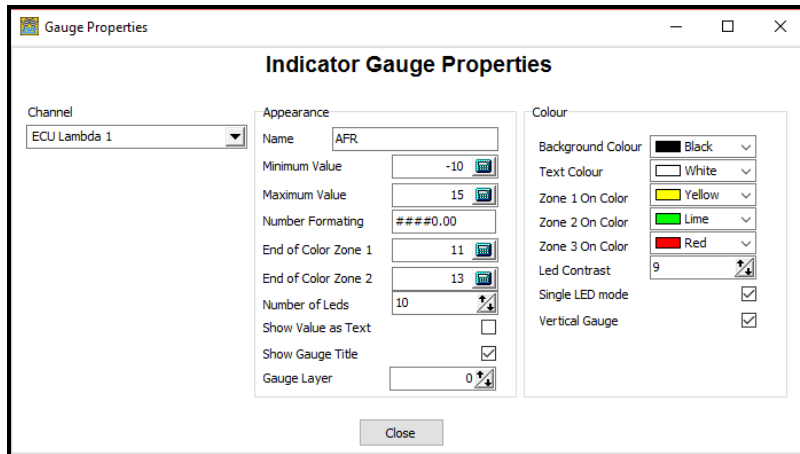
Show gauge tile

Tick this field if you want to show the gauge title.

Show Frame

If you want a frame around the gauge the tick this field.

Indicator gauge



Channel

Select the data channel you want displayed on this gauge. If there are no channels to select then you have not selected any channels to display. See “Select Channels to Display”

Minimum Value and Maximum Value

These values set the minimum and maximum number span for the gauge.

IE if this gauge is used to show Exhaust gas temperature then you will set the max value to 1200, min value to 0.

Number formatting

This describes the numerical formatting for text values.

= Do not show leading zeros.

0 = Show leading zeros

. = Decimal place

This format “**##0.00**” will show numbers with 3 significant digits and 2 decimal digits. The “#” symbols will only show numbers that are greater than zero.

End of colour zone 1

The indicator gauge can display 3 colour zones. Set the value for the end of zone one. Gauge values below this value will be shown using the “**Zone 1 on Colour**”

End of colour zone 2

Set the value for the end of zone two. Channel data values below this value and above zone one value will be shown using the “**Zone 2 on Colour**”. Any channel data values above the “**End of colour zone 2**” will be shown using the “**Zone 3 on Colour**”.

Number of LEDs

This gauge shows a series of LEDs that span from left to right or bottom to top. Select the number of LEDs to use in the span. More LEDs give a finer gauge. If you select too many and the gauge is not long enough then they will not be displayed

Gauge Title

Set the title you want displayed on the dash screen. If left blank then the channel name will be shown. This is only active if you select to show the gauge title.

Gauge Layer

This controls whether a gauge is shown on top of another. A gauge with a higher number is shown on top of a gauge with a lower number. This allows you to place a gauge in a position that partly obscures another gauge.

Background colour

This is the colour for the area of gauge outside of the round dial face.

Text Colour

This is the colour of the text and ticks of the gauge.

Show Value as text

Tick this field if you want to show the gauge value as text just above the gauge.

Show Gauge title

Tick this field if you want to show the gauge title just above the gauge.

Vertical indicator

This gauge can span from left to right or bottom to top. To make the gauge span from bottom to top then tick this property.

LED Contrast

This is a number between 5 and 10 that controls the LED brightness difference between ON and OFF. A value of 5 will show the OFF LED brightness at half the level of the ON LED brightness. A value of 9 will show the LED at 9 times less bright and a value of 10 will completely turn the LED OFF.

Updating Dash Firmware

The EDL8 race has 2 types of firmware, one is used for the dash functions and data logging and the other is used for the dash display functions. Each firmware is updated in a different manor. The Dash function firmware is updated using the SD card and the display functions firmware is updated using a USB memory stick.

Updating Dash Function firmware

Before you can use an SD card for the EDL8 race dash it must be initialized See "Initializing the SD card" for instructions. Initialization only needs to be done once for each SD card.

1. From the Data View screen menu select "Dash Manager" -> "EDL8" to show the Dash Manager screen.
2. Select the SD card drive letter using the "Select SD Card" selection box.
3. From the Dash Manager menu select "SD Card"->"Load New Firmware to SD Card". This will show a screen where you can select the firmware file you want to load. Each firmware file is named EDL8_X.fim where X will indicate the firmware version. After selecting the firmware file press the "Open" button. This will put the new firmware on to the SD card.
4. Put the SD card in to the dash SD card slot and turn on the race dash. The LED lights on the left side will flash to indicate that is it loading the new firmware.
5. After the LED lights stop flashing you must re-start the race dash.

Updating the Display function firmware

This procedure has 2 phases. Phase one is performed on the laptop, this phase saves the display firmware onto the USB stick. Phase two is done on the Race dash, this phase puts the new firmware into the Race dash memory. Before you can complete these steps you must have a USB hub so you can connect a mouse and USB stick to the race dash.

Phase one:

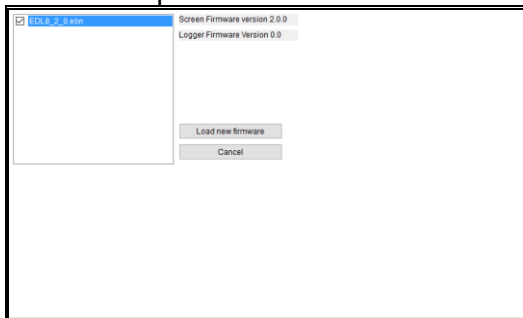
1. From the Data View screen menu select “Dash Manager” -> “EDL8” to show the Dash Manager screen
2. Place a standard USB Memory stick in to one of the laptop USB slots
3. From the Dash Manager menu select “SD Card”->”Load screen Firmware to USB”. This will show a screen listing all available firmware files. Click the box next to the firmware file you want to load. A tick will indicate the selection
4. Press the “Save to USB” button. This will place the select firmware file on to the USB memory stick.

Phase two:

1. Plug the USB hub in to the USB port on the side of the race dash.
2. Turn on the Race dash if it is not already on.
3. Remove the USB memory stick from the laptop and place it into the USB hub that is connected to the Race Dash
4. Also, connect a mouse to the USB hub. Once the Race dash detects a mouse the mouse pointer will appear.
5. Move the mouse pointer to the word “Setup” at the bottom of the dash screen and click it. This will show the firmware update screen with a list of firmware files saved on he USB memory stick.
6. Click on the box next to the firmware file you want to load. A tick will appear next to the selected firmware file.
7. Press the “Load new Firmware” button.
8. After about 15 seconds a message will appear indicating that you must re-set the dash. Once the dash re-starts, the new firmware will be loaded and running.

Note: You may need to restart the dash a second time if you find that is it not connected to the ECU.

Firmware Update Screen



Data View

The Data View screen is the initial screen shown when you start the analyser software. It allows you to view log data in a graphical form. You can view multiple log files together so you can compare two or more sessions.

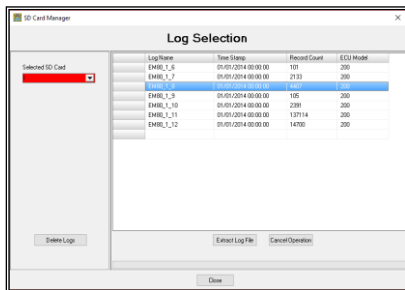
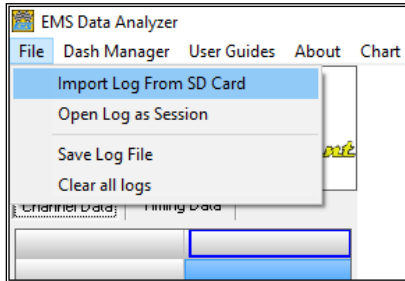
When you select channels to display, the software will automatically display channels with the same name together in the same graph. This allows you to overlay similar data for easier comparison. The channel data values are also shown in text form on the left side of the screen. As you move the mouse pointer over the chart the text data changes to show the numeric value for each channel in the log pointed to by the mouse cursor.

When adding a channel to the data chart and display setting for the channel have not be set then the chart minimum and maximum span will be automatically set based on the minimum and maximum data value detected in the log.

Importing a log file from the SD card

The EDL8 saves all log files to the SD card. Each log session is saved as a separate file on the SD card. Before the recorded data can be displayed it must be extracted from the SD card.

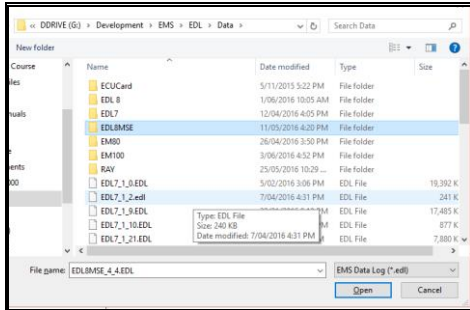
To import a log file from the SD card:
Select menu option “File”->”Import file from SD card”



Select the SD card from the “Selected SD Card” dropdown box, Click on the log session you want and press the “Extract Log File” button. After extraction, the log file will be saved using the “Log Name”, it will also be automatically loaded into the analysis screen.

Opening an imported Log File

To open an imported log file as a session, go to menu option “File” -> “Open Log as Session”. The log data from each card is grouped into a folder having the same name as the SD card. Double click on the folder name to show all saved logs in the selected folder. Then select the log you want to view and press the Open button.



This will create a column of channel values. You can also open a second log file in the same way and the system will create a second column for the newly opened log.

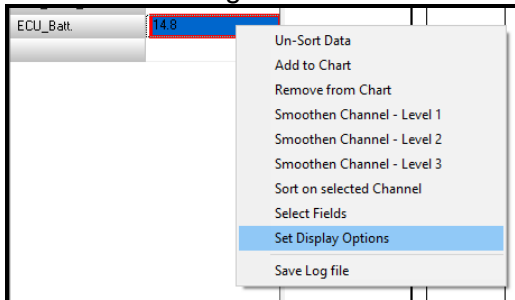
The amount of time to open a log file will depend on the amount of data recorded in the file.

Channel Data

The Channel Data section displays data in a textual way and also provides a means of selecting individual channels for displaying and sorting. All functions are accessible from the popup menu. The popup menu is activated when you press the right mouse button while the mouse pointer is on channel data grid.

The selected function will be done on the selected data channel. The selected data channel is shown with a blue background colour. To select a data channel you must click in the data for the desired channel with the left mouse button.

All of the following functions are accessed from the popup menu.



Selecting a channel to display.

Select "Add to Chart" from the popup menu.

You can select as many channels as can reasonably fit onto the chart screen. If you are analysing multiple logs or multiple laps, the system will overlay data channels with the same name. If you select channels with different names then the software will create a new chart for each channel.

To display data for a channel double click on it or you can click it once then press the right mouse button. This will show a pop-up menu where you must select the Add to Chart option. Do this for each channel you want to view.

Remove a data channel from the chart

Select "Remove from Chart" from the popup menu.

To remove a data channel from the chart, first click on the channel you want to remove then press the right mouse button to display the pop-up screen, now select the "Remove from Chart" option.

Sorting the data

Select "Sort on Selected Channel" for the popup menu.

The logged data is sorted in the same sequence that it was recorded, however there are times when you may want to sort the information in ascending order of a particular channel.

To sort the data according to a particular channel first click on the desired channel and press the right mouse button to display the pop-up menu. Select the Sort on Selected Channel option and wait for the software to re-sort the data. Once sorted the channel name of the sorted channel will be shown as a darker grey colour.

Un-sorting the data

Select "Un-sort data" from the popup menu.

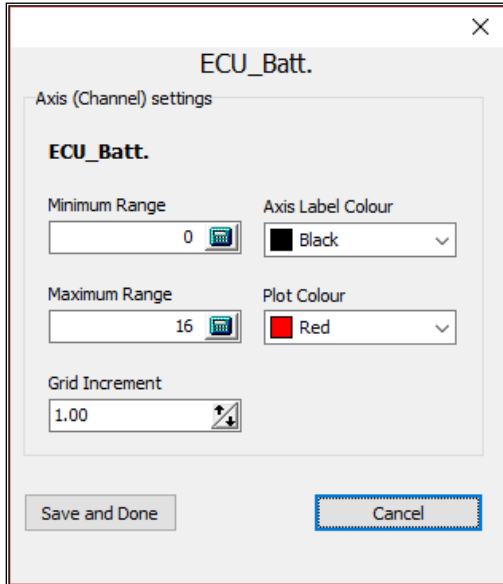
If you sorted the data but now want it sorted back into the default recorded sequence first click on any data channel, then press the right mouse button and select the Un-sort Data option. You must wait until the software re-sorts the data back to the default sequence.

Set Display Options

Select "Set Display Options" from the popup menu.

This allows you to set the graph span (Min / Max) for the selected channel, the plot colour, grid colour, text colour, grid increments (spacing) and grid lines. These settings can be saved permanently when you save the log file. Each time you open this same log file these setting will be used. If they are changed them the file must be re-saved.

Display Option Screen



Minimum Range and Maximum Range will set the vertical span of values for the selected channel.

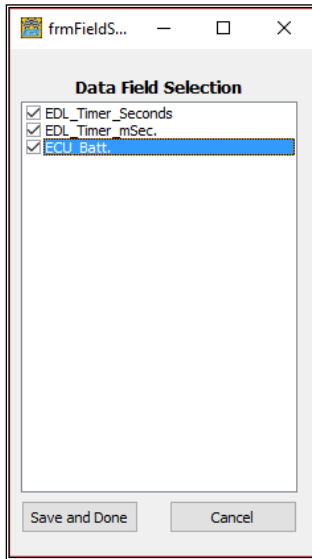
Axis Label Colour will set the number and text colour on the left side of the axis.

Plot Colour will set the line colour of the graph.

Grid increment will set the horizontal grid spacing for the selected axis.

Selecting only specific data channels

Select the “Select Field” option from the popup menu.



This function will list all available data channels. You can select to display only a selected set of channels.

Click the square beside the channels you want to view and leave all other channels un-ticked.

When finished press the “Save and Done” button.

Smoothen Channel

You can make the graph lines look smoother by selecting one of the “smoothen level” filters.

Select the data channel you want to apply the smoothen filter and then select it level you want from the popup menu.

Save the log file

Each Channel Data column is a separate log file. To save a log file of a specific column you must have at least one data channel selected in the column so the system knows which log file you want to save.

To save the log file select "Save Log File" from the popup menu.

This will display the Save screen where you can change the file name or file location and press the save button. You can also save the file in the same location and with the same name. A log file needs to be saved if there were changes made to display settings and other parameters and you want to make these changes permanent.

Track Timing

This function allows you to draw vertical timing lines on the chart. It is mainly used for drag racing where you would enter the reaction time, 60 foot time, etc. After you entered these times you must press the apply button to show the vertical lines for each time data.

To permanently save this information you must save the log file.

Parameter	Value
Reaction Time	0.4
60 ft Time	1.5
330 ft Time	2.4
660 ft Time	4.5
1000 ft Time	6.8
1320 ft Time	8.1
660 MPH	135
1320 MPH	145

Show Split Lines

Line Colour: ■ cBlack

Apply

Selecting different Chart options

You can display information in different ways.

You can display data channels overlaid on the same chart or view them in a different chart format such as scattered or as bars. You can do this by pressing the appropriate button just above the chart screen.

Separated charts

This is the default format. In this mode each data channel with a different name will be shown in a separate chart.

Overlaying charts

If you want to overlay every channel onto the same chart then press the overlaid button before selecting the channels you want to view.

Line charts

This is the default data display. It shows recorded information as a line. This is the most common and easiest to understand chart form.

Zooming into the chart

To zoom into an area of the chart, start the mouse pointer at the top left corner of the area, press the right mouse button and drag a square that covers the area you want to zoom into then release the button. To un-zoom the chart simply perform the reverse action starting from bottom right. This same action can also be done on the track maps.

Dragging a chart

You can drag the chart to show hidden data.

Place the mouse pointer anywhere on the chart, press the right mouse button and drag to move the entire chart left, right or down.

Zeroing the log time reference.

The log data is ordered by time. If the log was recorded at 200 logs per second then the time between points is 5mS. If it was recorded at 100 log per second then the time between points is 10mS.

Setting a zero reference point is useful when you need to reference data to a specific starting point on the chart. This is also useful when comparing 2 separate logs of similar log session. By referencing both logs to the same time reference makes comparing them more meaningful.

To set the zero reference point for a log:

1. Zoom into the area of the chart where you want to set the zero reference. This will allow you to more accurately position the mouse pointer onto the point you want as the zero reference.
2. Press and hold the keyboard shift key
3. Move the mouse pointer to the position along the chart line where you want the new zero point. As you move the mouse pointer along the line the data point will change colour.
4. When you have moved to the desired data point press the left mouse button. This will set the data point to zero. Any time values to the left of this point will be a negative value and all values to the right will be positive value.
5. Save the log file to make the new zero reference point permanent.

Note: If you have zoomed in to select a zero reference point then you must zoom out again to see the new zero reference point.

EDL8 Loom Pin out**28 Pin plug**

Pin Number	Pin Description	Wire Colour
1	Aux output 1	Yellow
2	Aux output 2	Yellow
3	5 Volt Ref	Orange
4	Aux output 3	Yellow
5	Pulse Input 3	Green
6	Pulse Input 6	Green
7	Pulse Input 5	Green
8	Ground	Black
9	Aux output 4	Yellow
10	Pulse input 4	Green
11	0-5 Volt input 5	Blue
12	0-5 Volt input 8	Blue
13	0-5 Volt input 6	Blue
14	5 Volt Ref	Orange
15	5 Volt Ref	Orange
16	Switch input 2 : Screen Change	Green
17	Switch input 1	Green
18	5 Volt Ref	Orange
19	Beacon Pulse	Green
20	Ground	Black
21	Ground	Black
22	0-5 Volt input 4	Blue
23	0-5 Volt input 3	Blue
24	0-5 Volt input 2	Blue
25	0-5 Volt input 1	Blue
26	0-5 Volt input 7	Blue
27	Pulse input 1	Green
28	Pulse input 2	Green

9 Pin plug

Pin Number	Pin Description	Wire Colour
1	Ignition Power	Red
2	GPS TX	Grey
3	GPS RX	Grey
4	CAN H	Grey
5	CAN L	Grey
6	GPS Module Power	Orange
7	ECU RX	Grey
8	ECU TX	Grey
9	Ground	Black

The Smaller 9 pin loom is terminated with the correct plugs ready to use with any EMS ECU.

If you are using any Motorsport or Stinger V4 and S2R ECU then use the 9 pin D-Type plug. This is the RS232 serial communications plug.

If you are using any EM-Tech ECU then you must use the Square CAN plug. This is the CAN BUS communications plug.

You must also connect the red wire from pin 1 to a switched power source and the black wire from pin 9 to ground. Preferably to the same ground as the ECU.

The power source should not exceed 22 volts.