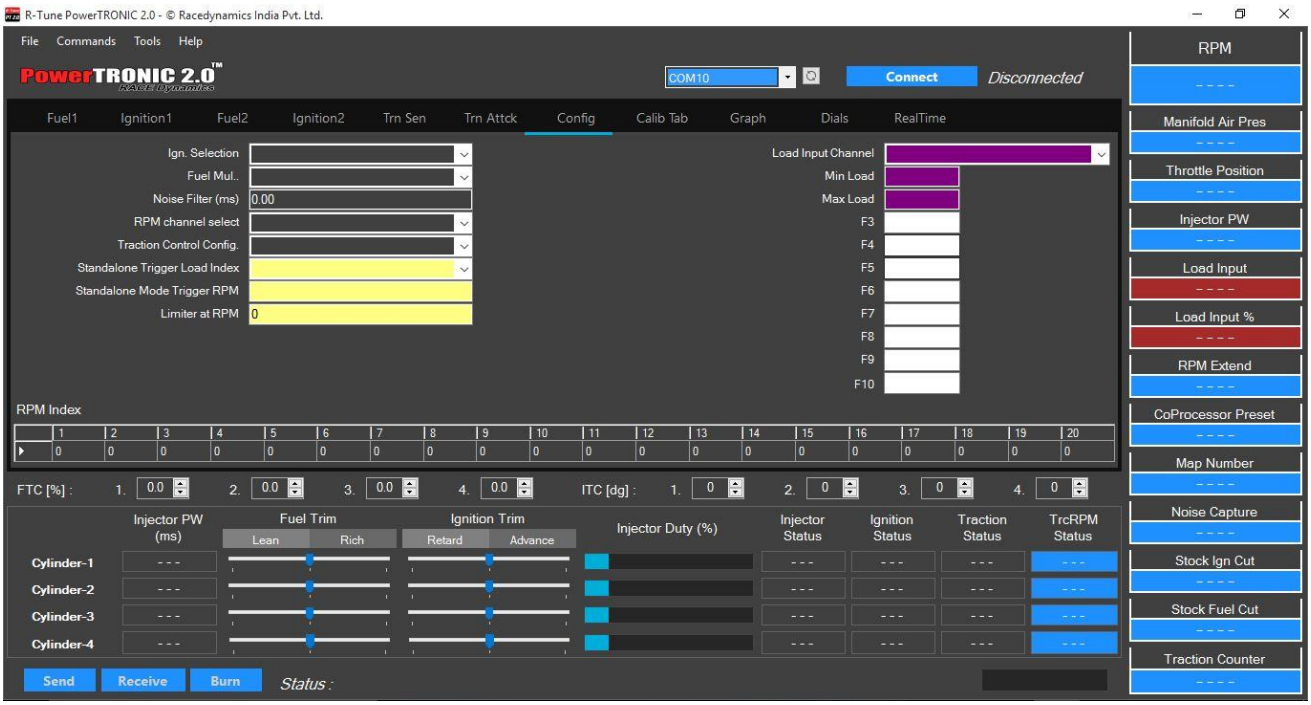
PowerTRONIC™ 2.0



RACE dynamics

VER 2.1.5.8-Beta

www.racedynamics.in

Content

PREFACE

This manual contains instructions about POWERTRONIC; it's use, care, maintenance and technical data.
Please read this Manual carefully. Operation in accordance with these instructions is a prerequisite for proper use of the system.
We hope that the use of our product transcends into an experience.

SETTING UP *R-TUNE PowerTRONIC 2.0* TUNING SOFTWARE

2. A. SYSTEM REQUIREMENTS

We recommend the following system configuration

OPERATING SYSTEM	WINDOWS XP/VISTA/7/8/10
RAM	512 MB (minimum)

2. B. SETUP WALKTHROUGH

- Open/Extract (using winzip/winrar/7zip etc) the *setup.zip* file and run *setup.exe.*
- Follow the installation wizard to complete the installation process.
- The setup automatically places a shortcut to *R-TUNE PowerTRONIC2.0* on your desktop.

2. C. CONNECTING TO THE UNIT

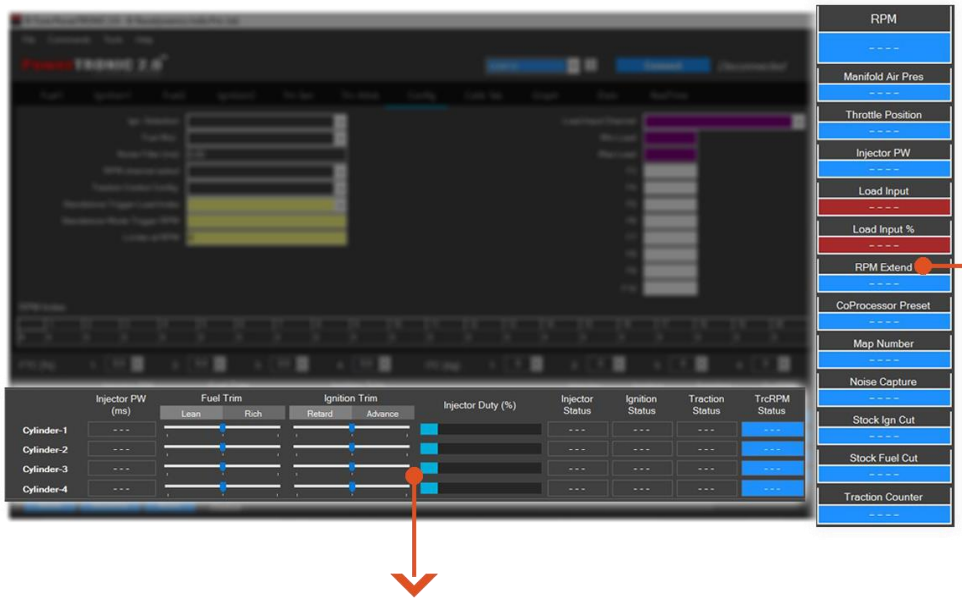
a. *The PowerTRONIC comes with the SiLabs CP2104 chipset for USB communication. You will need to download the drivers for your computer from here. Alternatively, you can search for 'CP2104 VCP' and download and install appropriate drivers.*

b. *Once installation is complete, plug in the PowerTRONIC to the computer using the shielded USB 2.0 cable provided, wait till Windows notification alerts you of a new device and finishes installation (first time use), then click refresh icon next to connect button, click on drop down list and choose the appropriate port number and click connect.*

c. *If you are not aware of the port number, you can go the device manager -> ports and look for CP2104 com port number, this is the port number allocated by windows for the device. Select this number from the drop down list on R-Tune PB and click connect. On successful connection you will have 'Connected' status and a free running status bar on the bottom right indicating data exchange in progress.*

d. *The PowerTRONIC is a USB powered device, so it does not need to be connected to a vehicle or specifically turned on to establish communication with the computer.*

3. R-TUNE PowerTRONIC 2.0 INTERFACE

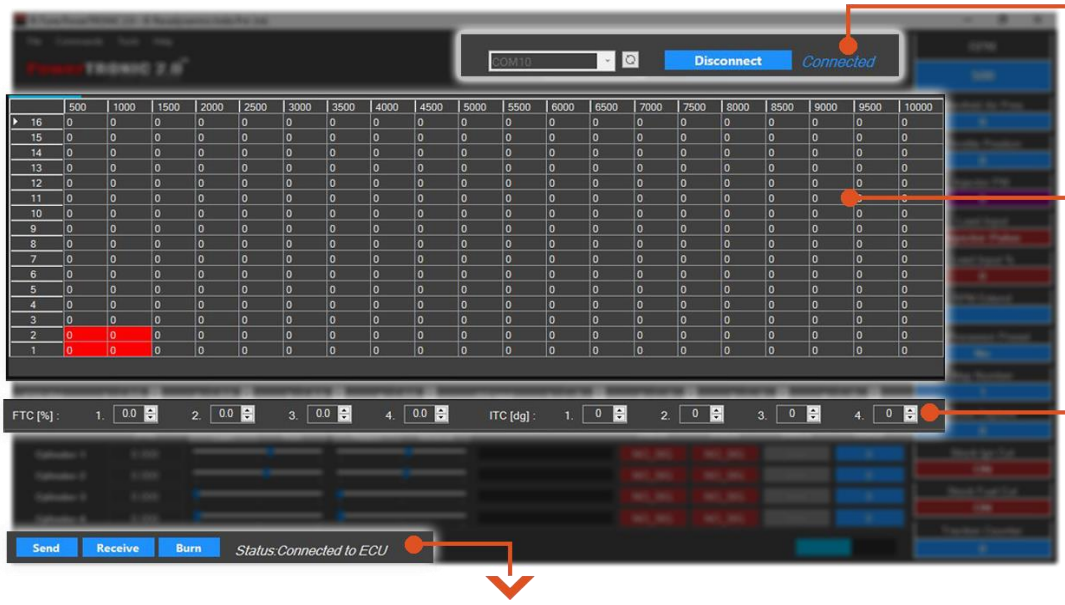


3.1 Real-Time data

Once connected to PowerTRONIC, live data such as RPM, Manifold pressure, Throttle position, etc. is displayed here

3.2 Cylinder specific information of the inputs and outputs

Individual cylinder live information is updated here, such as original injection pulse width, duty cycle, traction identification, action, etc.



Connect/Disconnect PowerTRONIC

Calibration/Maps

Cylinder specific injection and ignition adjustment

FTC->Fuel Trim Control

ITC-> Ignition Trim Control

Send and Receive data to/from PowerTRONIC

FTC adjustment is to increase or decrease the fuel table in a given percentage. It can be done for individual cylinder.

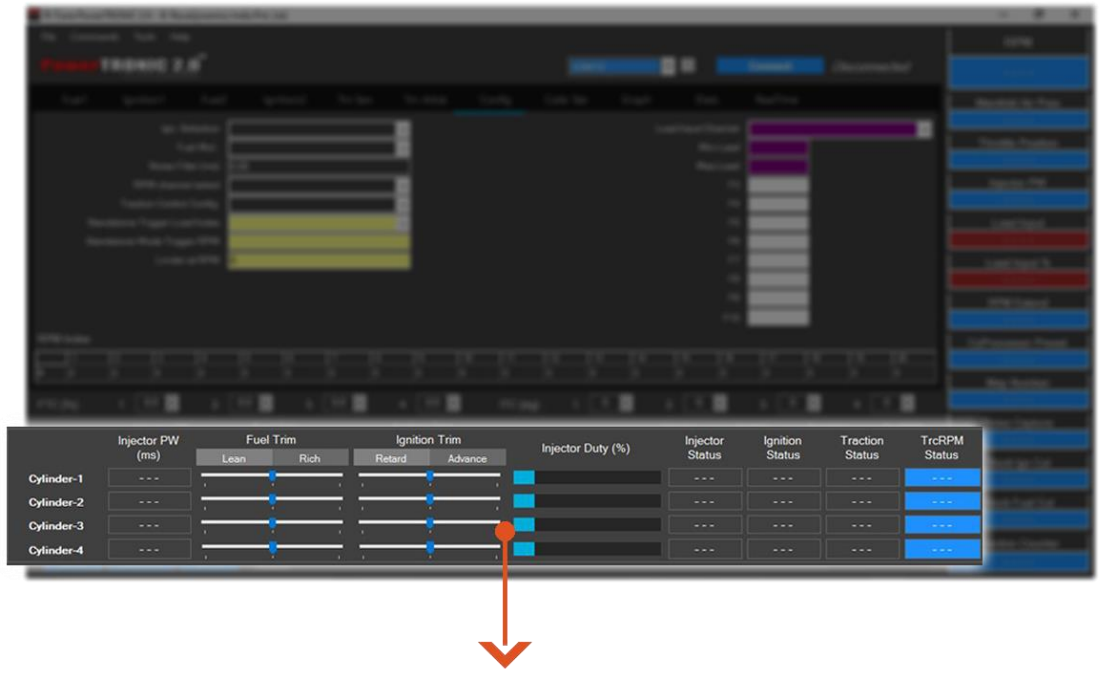
ITC adjustment is to advance or retard the ignition timing of the ignition table as a whole. It can be done for individual cylinder.

3. A. Real-Time data

	Parameter	*Function*	*Range*	*Additional Info*
A	*RPM*	*Display engine RPM, selectable source namely ignition or injection, in configuration.*	*Min and max values controlled by RPM index. See section 8.1*	
B	*Manifold air pressure*	*When connected, displays digital values of manifold pressure*	*0 to 255*	*If MAP is selected as primary source of load reference, then background color will be brown, else background color is blue*
C	*Throttle Position*	*When connected to TPS signal this displays digital values of throttle position*	*0 to 255*	*If TPS is selected as primary source of load reference, then background color will be brown, else background color is blue*
D	*Injection pulse width*	*Injection pulse width digital units, for load reference. Refer section 5.2 for more information*		*If Injection pulse width is selected as primary source of load reference, then background color will be brown, else background color is blue*
E	*Load percent*	*This is the percentage normalized load input calculation. Refer section 7.F and 7.M for more information*	*0-100*	

F	*RPM Extend*	*Status of RPM extend function*	*YES, NO*	
G	*Co-processor status*	*Shows status of co-processor, only 3 and 4 cylinder variants have a co-processor to handle additional processing*		
H	*Map number*	*Status of map selected. PowerTRONIC comes with 2 independent ignition and injection maps, selectable by switch or other methods*	*1,2*	*Function available only on select models*
I	*Noise capture*	*Everytime noise is sensed in the signal and is filtered, the counter increments by 1. Refer section 7.C for more information*	*0-255, and roll back to 0*	
J	*Stock ignition cut*	*When there is an ignition cut from the stock ECU (for example, a rev cut, deceleration, etc.) the status is updated here*	*Yes, No*	*Useful in calibration for rpm extend feature.*
K	*Stock fuel cut*	*When there is an injection cut from the stock ECU (for example, a rev cut, deceleration, post acceleration enrich transient, etc.) the status is updated here*	*Yes, No*	*Useful in calibration for rpm extend feature.*
L	*Traction counter*	*When traction is enabled, every time a slip is recognized and corrective action has been taken this counter is incremented by 1*	*0-255, and roll back to 0*	

- *Buttons “Send”,” Receive” and “Burn” are used to communicate with the ECU*
- *To read a “Map” from the ECU, click “Receive”, to send a “Map” to the ECU click “Send” and to make the “Map” permanent on the ECU click “Burn”*
- *On the Right of the screen you can see all the “Real-Time” values displayed, eg. RPM, Manifold Air Press, Throttle Position…etc*
- *On the bottom of the screen you can see status indication of Injector PW (ms), fuel trim (FTC), ignition trim (ITC), injector input signal, ignition input signal, injector duty and traction of each cylinder*

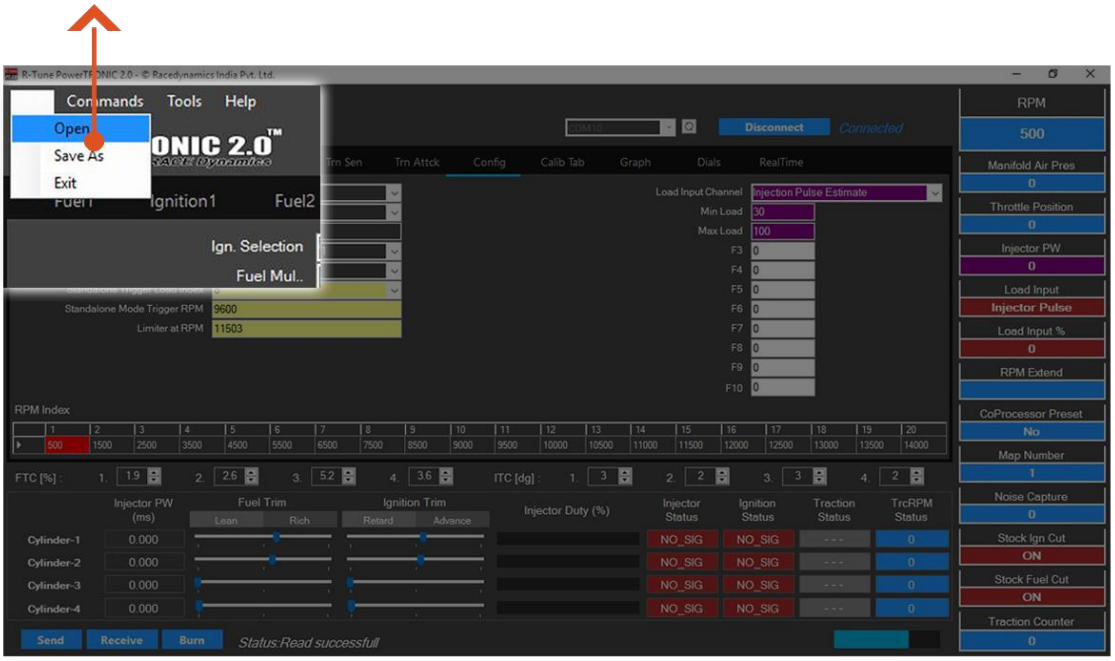


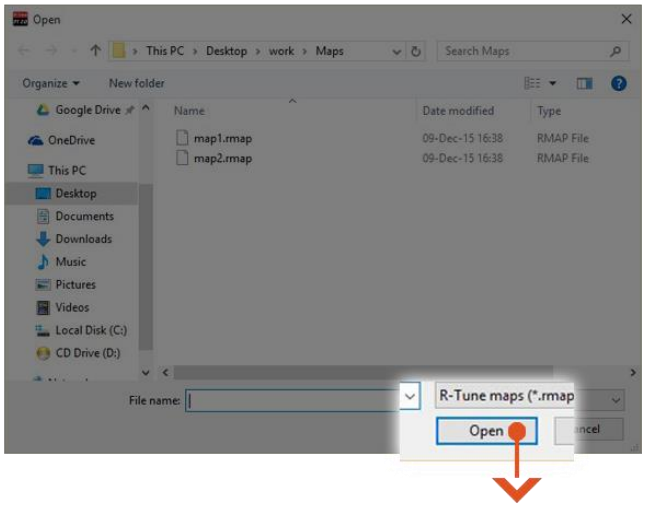
	Injector PW(ms)	*Fuel Trim*	*Ignition Trim*	*Injector Duty (%)*	*Injector Status*	*Ignition Status*	*Traction Status*	*TrcRPM Status*
Cylinder 1 *Cylinder 2* *Cylinder 3* *Cylinder 4*	*Injector Open Time in Milliseconds*	*Display Bar indicates if Fueling is Lean or Rich*	*Display Bar indicates if Ignition is Advance or Retard*	*Displays the Duty Cycle of respective injector opening*	*YES if Injector input signal from the Stock ECU is OK* *NO if injector input signal is NOT OK*	*YES if Ignition input signal from the stock ECU is OK* *NO if ignition input signal is NOT OK*		

3. B. Open Map and Save Map

To open a Map located on your computer click on File->Open. To save a Map on your computer

Click on FILE->SAVE AS



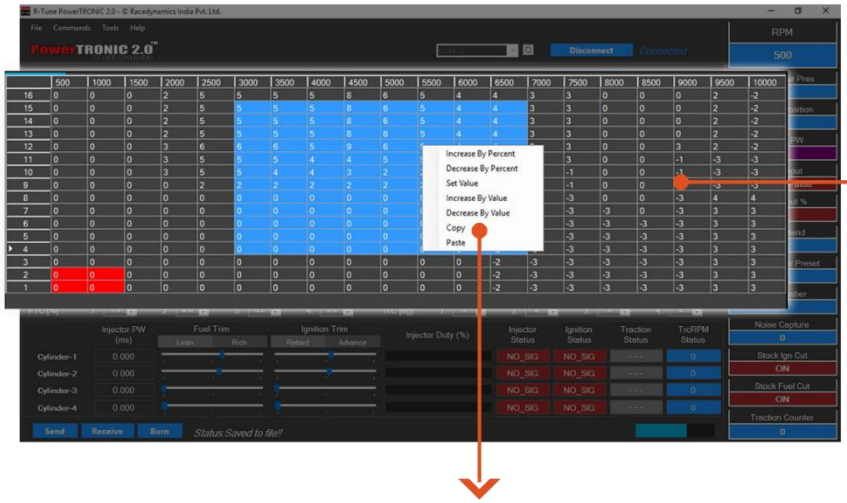


Select the required Map and Click Open.

When you want to save the Map, enter a name of your preference and click Save.

3. C. Fuel Mapping

This screen shows the Fuel Tab which is a Fuel Map



5.1 *This table is used to control fuel delivery. You can increase or decrease delivered fuel quantity. The fuel tables are arranged RPM vs Load, min load at the bottom and max load at the top, min RPM on the left and max RPM on the right.*

5.2 *The default values are set to 0 (Stock/Original calibration). As long as the values are at '0' the fuel injection quantity is just like the original ECU i.e. no fuel quantity modulation. Any value more than 0 increases fuel, and less than 0 decreases fuel, controlled as a percentage of original quantity. The non-negative difference between the table value and 0 is the difference in percentage changes*

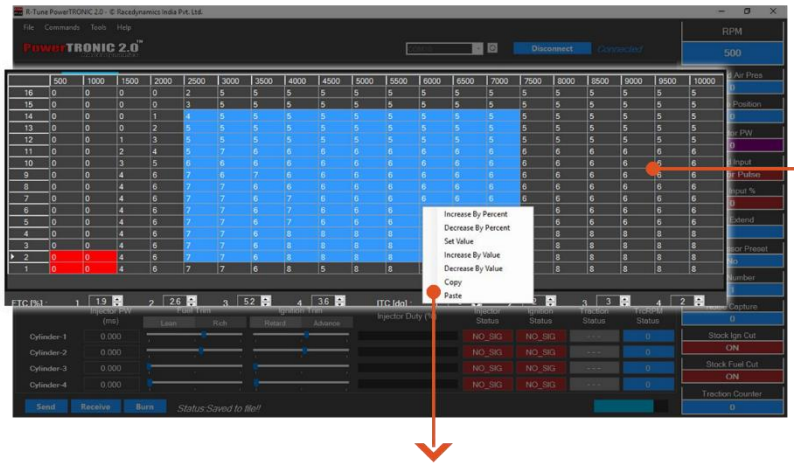
Note: Value Range -> -25 to +25

5.3 *To make any changes on the map you can either individually type in the values on each cell or select multiple cells and right click which will give you options to increase or decrease by percent or value or set the exact value .You can copy values from any cell and paste it in any other cell*

3. D. Ignition Mapping

This shows the Ignition Tab

This table is used to control the ignition timing of the engine. You can increase or decrease ignition timing of the engine.



6.1 *The ignition tables are arranged RPM vs Load, min load at the bottom and max load at the top, min RPM on the left and max RPM on the right.*

6.2 *The default values are set to 0 (Stock calibration). As long as the values are at '0' ignition timing is just like the original ECU i.e. no ignition timing modulation.*

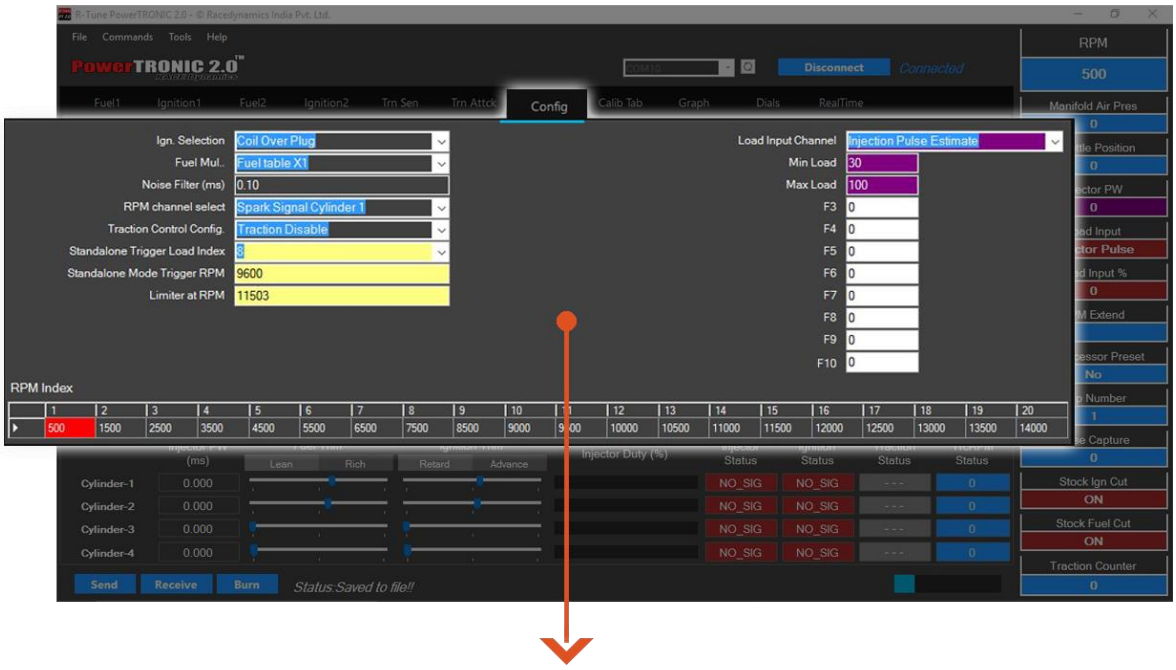
6.3 *Any value more than 0 advances ignition timing and less than 0 retards ignition timing. The non-negative difference between the table value and 0 is the difference in ignition timing (in degrees) change*

6.4 *To make any changes on the map you can either individually type in the values on each cell or select multiple cells and right click will give you options to increase or decrease by percent or value or set the exact value .You can copy values from any cell and paste it on any different cell.*

Note: Value Range -> -25 to +25

3. E. Configuration

This screen shows the Configuration tab



	Parameter	Function	Range	Additional info
A	Ignition Selection	Used to select Ignition Type of the Bike	1 – Wasted Spark 2 – Coil over Plug	
B	Fuel Multiplier	This is a multiplying factor for the increase/decrease in fuel. The fuel map difference as set in "Fuel1" can further be multiplied by a factor to extend the overall range of fuel quantity adjustments. In the "Fuel1" tab, the max adjustment that can be achieved is +25%/-25%	x2, x4, x6 and x8	Once the Max adjustment in the fuel table is reached, multiplier can be used to further increase the percentage accordingly
C	Noise Filter	This function is used to filter noise in input signals. Any input signal below the set value (ms) is ignored by the ECU as it is assumed to be noise signals. Set this value accordingly based on your application		The best suited value should be entered after a test of full RPM sweep

D	*RPM Channel Select*	*This parameter controls from which channel the RPM is read in the ECU*	*1.Spark single cylinder 1* *2.Spark single cylinder 2* *3.Injector single cylinder 1* *4.Injector single cylinder 2*	
E	*Standalone Trigger Load Index*	*This parameter controls the load index, above which the ECU injects fuel irrespective of original ECU injection values*	*Between 3 and 16*	
F	*Load Input Channel*	*The load reference the ECU is required to use can be set here, with the following choice of load reference*	*1.Throttle Position* *2.Manifold Pressure-Stock* *3.Manifold Pressure-on board 1ba* *4.Manifold Pressure-on board 1.5ba* *5.Injector Pulse Estimate*	*Options 3 and 4 are available only if Turbo Charged*
I	*Traction Control Config*	*To enable/disable traction control use the options in the drop down box*	*1.Traction Disable* *2. Traction by RPM/Time* *3. Traction by RPM*	
J	*Ignition Offset*			
K	*Standalone Mode Trigger RPM*	*This parameter controls the RPM index, above which the ECU injects fuel irrespective of original ECU injection values*	*Between 5000 and 9000 RPM*	
L	*Limiter at RPM*	*To set the Rev Limit*	*Max is 16000RPM*	

M	*Load Min and Load Max*	*This calibration should be done ONLY when Load Input Channel is Throttle Position. The min and max values can be noted on the Real Time variable TPS which is displayed on the right side of the screen*	*Load Min – Digital TPS value at Zero Throttle* *Load Max – Digital TPS value at 100% or Full Throttle*	

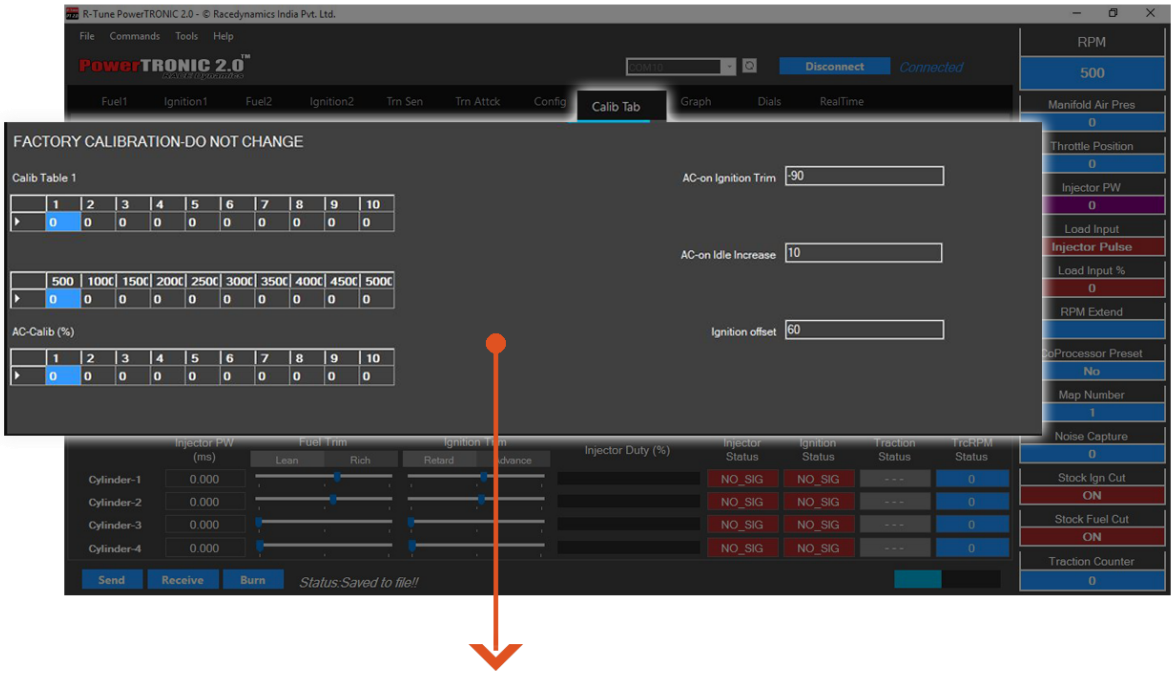
- *Note: The rev extending feature is available on engines where the rev limiter is activated by a fuel cut only, where engine synchronization is derived from ignition signals.*
- *When the revcut eliminate mode is active, engine rev cut can be controlled by 'Limiter at RPM' field in*

- *Conditions to enter revcut elimination mode, in the defined order-*
  1. Load has to be above Load index
  2. RPM has to be higher than RPM index
  Example – For KTM duke the parameters 'Injector override above RPM index' =10 and 'Injector override above load index' =8, means once the load is above load index 8, AND THEN when the RPM index is above index 10 (9000RPM), then the revcut eliminate mode is activated.

Note: These settings are best left to advanced users with the proper equipment to determine the proper adjustment required.

3. F. Calibration

This screen shows the Calib Tab



8.1 *The RPM index on the fuel and ignition tab can be calibrated using the table RPM Index x 1000*

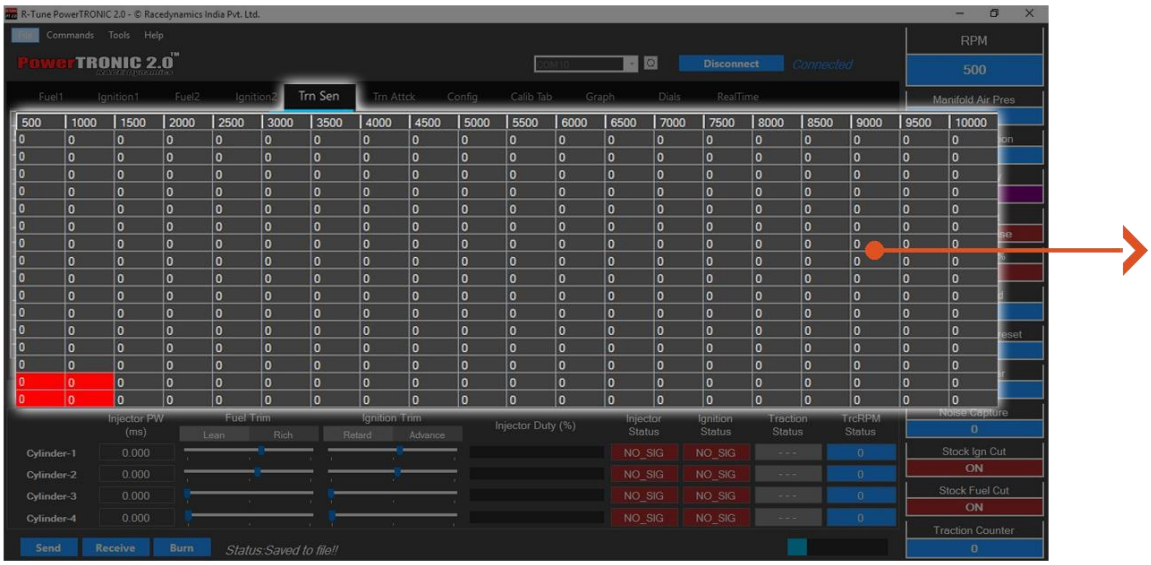
Ex. Under index 1 enter 0.5 (500RPM)

Under index 2 enter 1.0 (1000RPM)

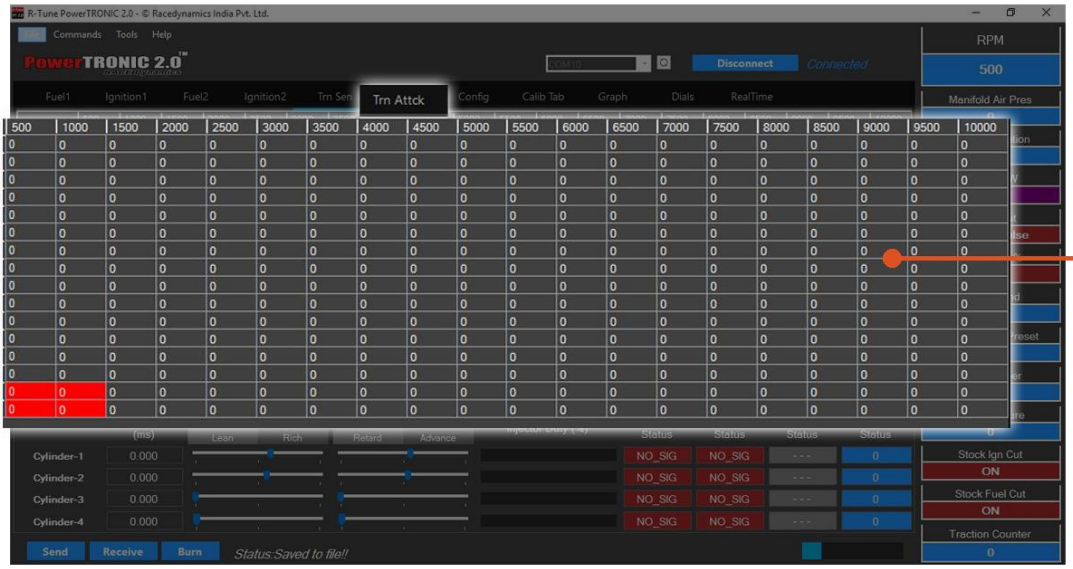
Under index 3 enter 1.5 (1500RPM)

The value you enter is multiplied by 1000 and displayed

3. G. Traction Sensitivity



3. H. Traction Attack



3. I. Dials

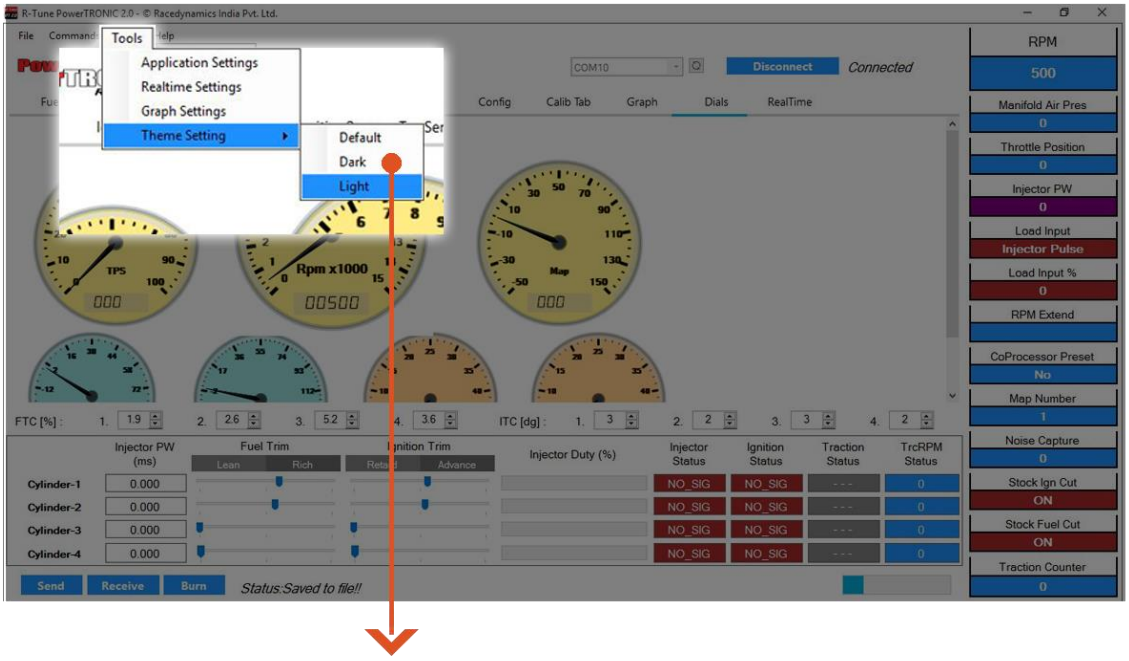
This screen shows the dials tab

To view real-time data in a graphical representation

Virtual Dials

3. J. Theme Change

This screen shows how to change the theme of the tuning software



Clicking on Tools->Theme gives you options to change between different themes