

## PowerTRONIC Maps

<b>Document Version</b>	2	<b>Release Date</b>	05 March 2019
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<b>Application information</b>	<b>Generic</b>
Vehicle	<b>Not Applicable</b>
Model	<b>Not Applicable</b>
Year of manufacture	<b>Not Applicable</b>
PowerTRONIC application	All PowerTRONIC ECUs, from firmware version F.3.x onward

**Note:**

- Read through all instructions before installation and use
- Ensure the bike is switched off and the key is out of the ignition before proceeding with the installation
- Some parts of the bike may be hot and will cause burns. Proceed with caution or wait for the bike to cool down.
- Once the installation is complete, make sure to secure the wiring loom away from the movable parts or components which tend to heat up during the normal operation of the vehicle.
- PowerTRONIC is intended for motorsport use on a closed course, please check with your local laws before using this product. Race Dynamics / PowerTRONIC is not liable for consequences that may arise out of using the product.

**Support**

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## 1. Maps

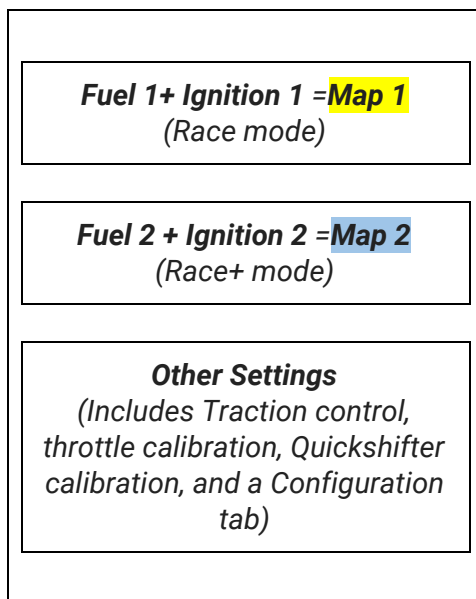
A map file is the program containing values that determine the ignition, fuel injection and other vehicle-related settings (Traction control, quick shift etc) intended for engine operation. A map file contains 2 maps and other necessary settings.

A PowerTRONIC map file has 3 parts:

1. Pre-tuned map 1 (Fuel 1 and Ignition 1)
2. Pre-tuned map 2 (Fuel 2 and Ignition 2)
3. Other settings (QS, traction control, configuration...)

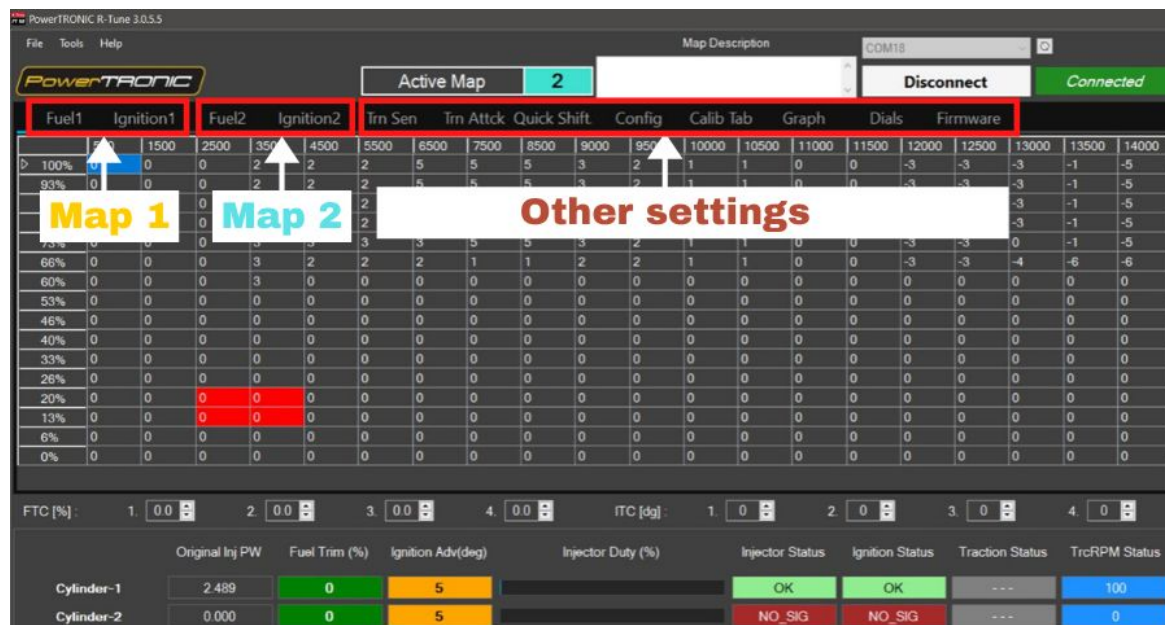
A schematic representation of a map file is given below.

*MAPFILE*



The PowerTRONIC ECU can store a map file that contains two maps. When you load a map file, you are loading both map 1 and map 2 simultaneously.

Refer to the R-Tune user interface below. There are 12 tabs present and each tab directs to each parameter of the map file.



The order of the tabs are as following

Fuel 1 Tab	Map 1	Fuel table of Map 1
Ignition 1 Tab		Ignition table of Map 1
Fuel 2 Tab	Map 2	Fuel table of Map 2
Ignition 2 Tab		Ignition table of Map 2
Trn Sen Tab	Other settings	Traction control settings
TRN Attack Tab		Traction control settings
Quick shift Tab		Quick shifter settings
Config Tab		Configuration settings
Calib Tab		Calibration settings
Graph Tab		Graphs
Dials Tab		Dials
Firmware Tab		Firmware Tab

## 2. Switching between maps

PowerTRONIC is shipped with two pre-tuned maps. (Map 1- Race mode, Map 2- Race+ mode).

Map 1 or Race mode offers performance gains starting from lower to mid-range RPMs, whereas Map 2 or Race+ mode is a more aggressive map offering performance gains starting from lower to top-range RPMs.

You can switch between the 2 onboard maps **by connecting (map 2) or disconnecting (map 1) the map switch connector on the PowerTRONIC wiring harness (Fig A)** or by using the handlebar map switch (Fig B) sold separately.

Disconnected - Map1  
Connected - Map 2

Fig A



Fig B



The chosen map will be active and the other map in the ECU will be inactive.

## Active Map

When you read a map file in R-Tune software, all the data in the maps will be present in the tabs, which contains parameters. The active map section in R-Tune will tell you at which map (Fuel and ignition parameters) the ECU is working, whether it is Map 1 or Map 2. It may be either Map 1 or Map 2. The other settings are common for both Map 1 and Map 2

		Fuel1	Ignition1	Fuel2	Ignition2	Trn Sen	Trn Attck	Quick shift	Config
		0	9	0	0	1600	2000	2500	3000
73%	4	6	4	5	6	5	4	4	5
66%	4	6	4	5	5	5	4	4	5
60%	4	6	4	5	5	5	4	4	5
53%	4	6	5	6.6	6.6	4	4	4	5
46%	4	6	6	6.6	6.6	4	4	4	5
40%	7	5	5	5	5	5	5	4	5
33%	7	5	5	5	5	5	5	4	5
26%	7	5	5	5	5	5	5	4	5

The map currently running in the ECU is 1.

		Fuel1	Ignition1	Fuel2	Ignition2	Trn Sen	Trn Attck	Quick shift	Config
		0	25	0	0	5500	6500	7500	8500
73%	0	0	0	3	3	2	5	5	3
66%	0	0	0	3	2	2	5	5	3
60%	0	0	0	3	0	0	5	5	3
53%	0	0	0	0	0	0	5	5	3
46%	0	0	0	0	0	0	5	5	3
40%	0	0	0	0	0	0	5	5	3
33%	0	0	0	0	0	0	5	5	3
26%	0	0	0	0	0	0	5	5	3

The map currently running in the ECU is 2.

Also, when you save a map file from the ECU or Load a map file to the ECU, it saves/loads both map 1 as well as Map 2 regardless of which map is active.

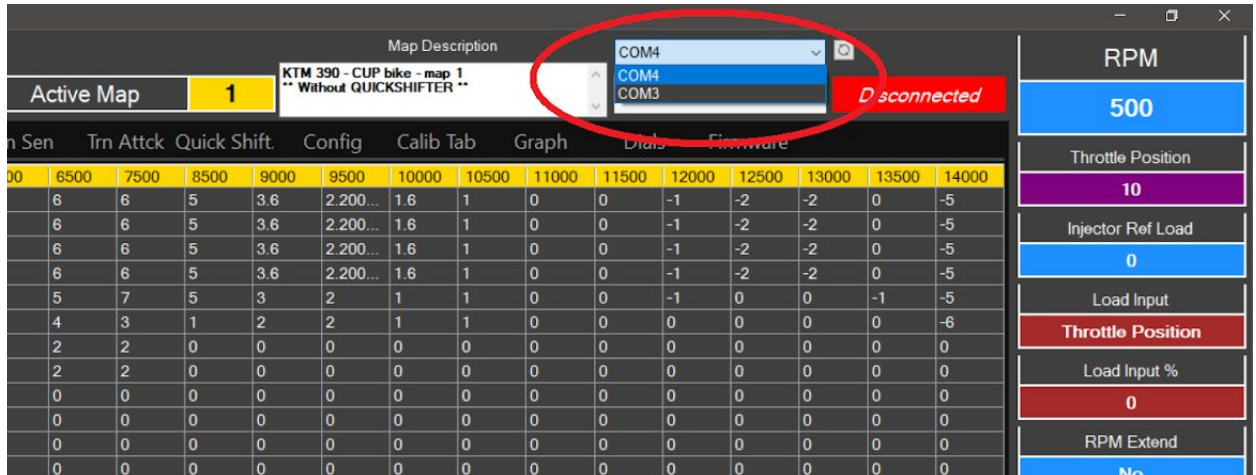
To verify which map is currently selected, you can also observe the **green LED** on the PowerTRONIC ECU.

One Blink = Map 1, Two Blinks = Map 2

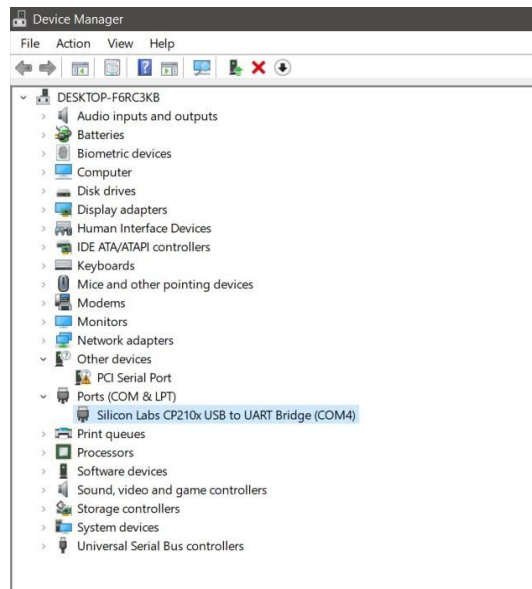
### 3. Reading the Map from the ECU

To read the map from PowerTRONIC ECU, use the R-Tune software. (Refer the R-tune Installation and connecting to the ECU manual)

1. Connect PowerTRONIC ECU to the PC using USB data cable provided in the kit.
2. Open the R-Tune software.
3. Select **com port** number.



NOTE: (To confirm PowerTRONIC com port number, Right click on **My Computer** >> Right Click on **Properties** >> **Device Manager** >> Double click on **Ports (COM & LPT)** and note the **COM** number within the braces on **Silicon labs CP210x USB to UART Bridge**. Refer to the image below





4. On the R-tune software, click on **Connect** and then **Receive**. Look for the values of fuel and ignition on a table as below.

PowerTRONIC R-Tune 3.0.5.3

File Tools Help

PowerTRONIC

Active Map 1

Map Description: KTM390 stock bike - map 1 -- Without Quickshifter --

COM4

Connect Disconnected

RPM: 500

Throttle Position: 10

Injector Ref Load: 0

Load Input: 0

Throttle Position: 0

Load Input %: 0

RPM Extend: No

CoProcessor Present: Not Present

CKP Decode: Not Present

Crank Signal Type: Not Present

Noise Capture: 0

Stock Fuel Cut: ON

Stock Ign Cut: ON

Traction Counter: 0

	Fuel1	Ignition1	Fuel2	Ignition2	Trn Sen	Trn Attck	Quick Shift	Config	Calib Tab	Graph	Dials	Software							
100%	0	0	0	2	2	2	5	5	5	3	2	1	1	0	0	-3	-3	-1	-5
93%	0	0	0	2	2	2	5	5	5	3	2	1	1	0	0	-3	-3	-1	-5
86%	0	0	0	2	2	2	5	5	5	3	2	1	1	0	0	-3	-3	-1	-5
80%	0	0	0	2	2	2	5	5	5	3	2	1	1	0	0	-3	-3	-1	-5
73%	0	0	0	3	3	3	5	5	5	3	2	1	1	0	0	-3	-3	0	-1
66%	0	0	0	3	2	2	1	1	2	2	1	1	0	0	0	-3	-3	-4	-6
60%	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
53%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
46%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
33%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

FTC [%]: 1. 0.0 2. 0.0 3. 0.0 4. 0.0 ITC [deg]: 1. 0 2. 0 3. 0 4. 0

	Original Inj PW	Fuel Trim (%)	Ignition Adv(deg)	Injector Duty (%)	Injector Status	Ignition Status	Traction Status	TrcRPM Status
Cylinder-1	0.000	0	0		NO_SIG	NO_SIG	---	0
Cylinder-2	0.000	0	0		NO_SIG	NO_SIG	---	0
Cylinder-3	0.000	0	0		NO_SIG	NO_SIG	---	0
Cylinder-4	0.000	0	0		NO_SIG	NO_SIG	---	0

Send Receive Burn Lock + Burn Status: Disconnected from ECU

[The **Active Map** tells you the current map running on the ECU]



## 4. Editing a Map on the ECU

**Warning: improper or a faulty map value can result in poor performance of the bike and can even cause damage to the engine.**

You can edit the maps either by changing the values of the map on the R-Tune interface or by directly downloading a map from our website. A brief description of editing the map is given below. (Refer the detailed manual of R-tune before editing the maps)

### a) Fuel mapping.

Click on the Fuel tab. (Refer figure below). The table is used to control fuel delivery through map 1 where you can increase or decrease the quantity of fuel delivered to the engine. The fuel tables denote RPM vs Load and spans between min load at the bottom to the maximum load at the top, also minimum RPM on the left and maximum RPM on the right.

The value '0' represents no changes to the fuel injection which is basically the factory settings. Fuel injection is always measured in terms of percentage. The positive value here indicates going richer than stock ECU. In contrast, a negative value indicates going leaner than stock ECU.

The screenshot displays the PowerTRONIC R-Tune 3.0.5.3 software interface. The main window shows a fuel mapping table for Map 1 (KTM 390 - CUP bike - map 1). The table has columns for Fuel1, Ignition1, Fuel2, Ignition2, Trn Sen, Trn Attck, Quick Shift, Config, Calib Tab, Graph, Dials, and Firmware. The rows represent RPM values from 1000 to 14000 and load values from 0% to 100%. The table is currently set to 'Active Map 1' and 'Connected'.

Below the table, there are input fields for FTC [%] (1, 2, 3, 4) and ITC [deg] (1, 2, 3, 4). The bottom section shows engine parameters for four cylinders, including Original Inj PW, Fuel Trim (%), Ignition Adv(deg), Injector Duty (%), Injector Status, Ignition Status, Traction Status, and TrcRPM Status.

On the right side, there is a vertical panel with various status indicators and controls, including RPM (500), Throttle Position (10), Injector Ref Load (0), Load Input, Throttle Position, Load Input %, RPM Extend, No, CoProcessor Present, CKP Decode, Crank Signal Type, Not Present, Noise Capture, 0, Stock Fuel Cut, ON, Stock Ign Cut, ON, and Traction Counter, 0.

## b) Ignition Mapping

Click on the ignition tab. (refer figure below). The table contains the values to control ignition timing. The value '0' represents no changes to the ignition timing/spark which is basically the factory settings. Ignition timing/spark is always measured in terms of degrees. The positive value here indicates advancing the ignition timing than stock ECU. In contrast, a negative value indicates retarding the ignition timing than stock ECU.

The screenshot shows the PowerTRONIC R-Tune 3.0.5.3 software interface. The main window displays the 'Ignition1' tab, which contains a table of ignition values. The table has columns for Fuel1, Ignition1, Fuel2, Ignition2, Trn Sen, Trn Attck, Quick Shift, Config, Calib Tab, Graph, Dials, and Firmware. The rows represent different throttle positions (100%, 93%, 86%, 80%, 73%, 66%, 60%, 53%, 46%, 40%, 33%, 26%, 20%, 13%, 6%, 0%) and different engine speeds (500, 1500, 2500, 3500, 4500, 5500, 6500, 7500, 8500, 9000, 9500, 10000, 10500, 11000, 11500, 12000, 12500, 13000, 13500, 14000). The values in the table are mostly 0, indicating no changes to the ignition timing. The interface also includes a 'Map Description' section, a 'Status' bar, and a 'Send/Receive/Burn' section.

**Map Description:** KTM 390 - CUP bike - map 1  
\*\* Without QUICKSHIFTER \*\*

**Active Map:** 1

**Disconnect** **Connected**

**RPM:** 500

**Throttle Position:** 10

**Injector Ref Load:** 0

**Load Input:** Throttle Position

**Load Input %:** 0

**RPM Extend:** No

**CoProcessor Present:** CKP Decode

**Crank Signal Type:** Not Present

**Noise Capture:** 0

**Stock Fuel Cut:** ON

**Stock Ign Cut:** ON

**Traction Counter:** 0

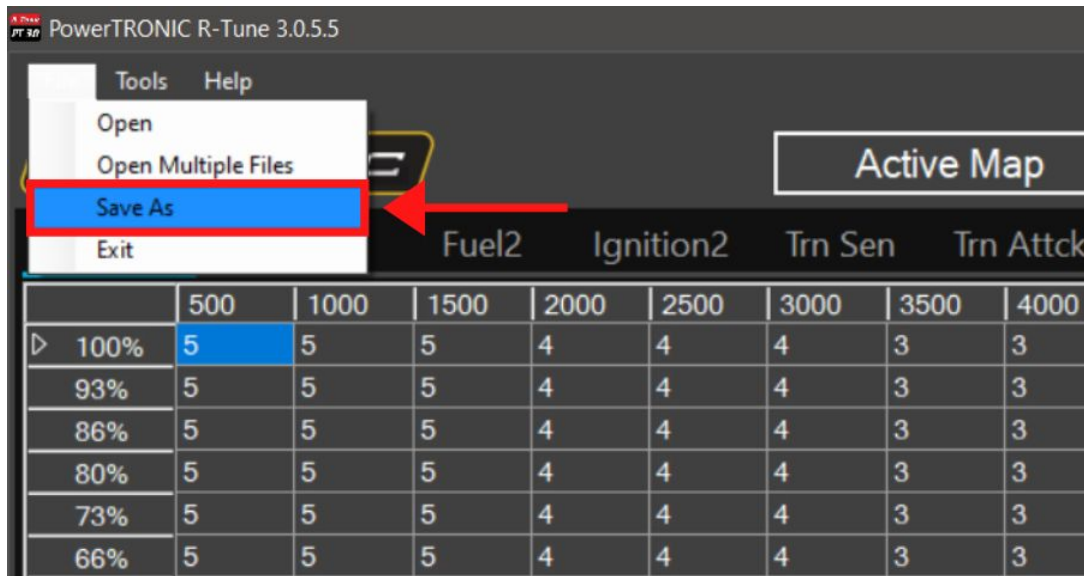
**FTC [%]:** 1. 0.0 2. 0.0 3. 0.0 4. 0.0 **ITC [dg]:** 1. 0 2. 0 3. 0 4. 0

	Original Inj PW	Fuel Trim (%)	Ignition Adv(deg)	Injector Duty (%)	Injector Status	Ignition Status	Traction Status	TrcRPM Status
Cylinder-1	0.000	0	0		NO_SIG	NO_SIG	---	0
Cylinder-2	0.000	0	0		NO_SIG	NO_SIG	---	0
Cylinder-3	0.000	0	0		NO_SIG	NO_SIG	---	0
Cylinder-4	0.000	0	0		NO_SIG	NO_SIG	---	0

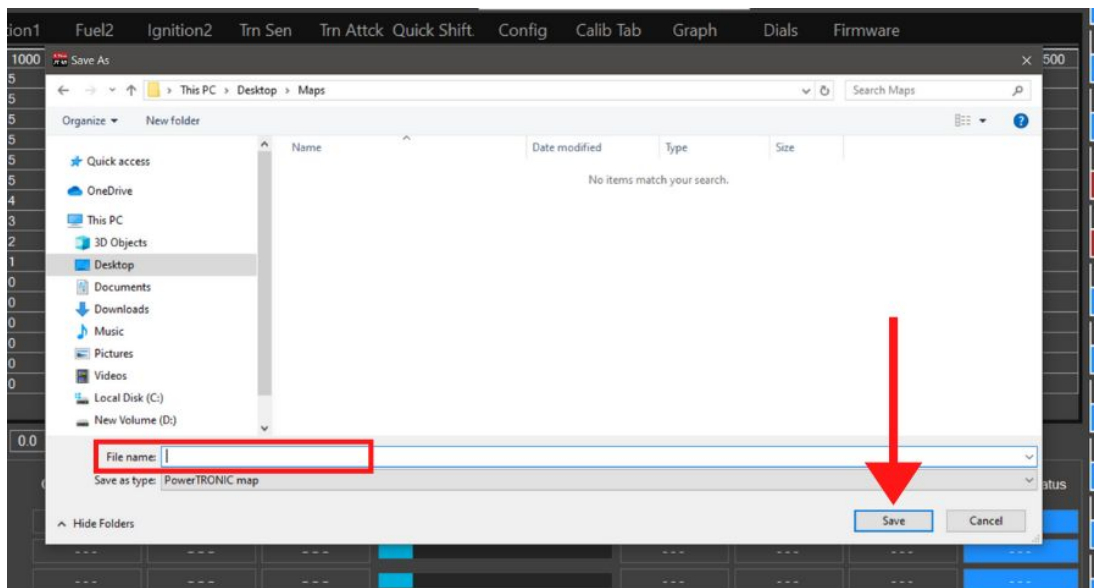
**Send** **Receive** **Burn** **Lock + Burn** *Status: Connected to ECU*

## 5. Saving the map to file folder of your PC/Laptop

1. Connect the ECU to the R-Tune software
2. Click on File Save As



3. Choose the location you want to save and add file name in the File name tab and click on Save

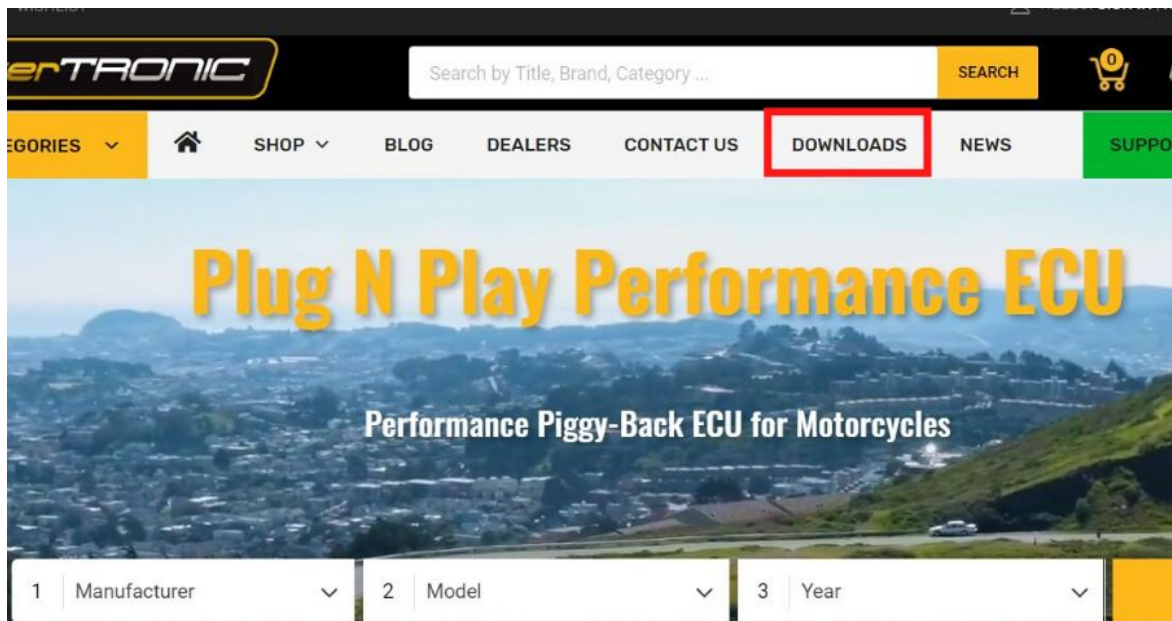


## 6. Downloading a map from the website

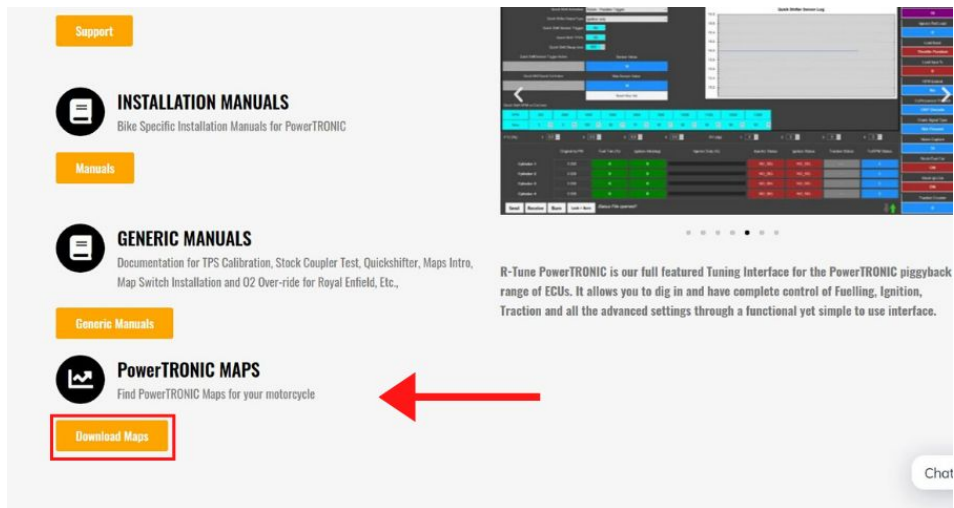
1. Go to [www.powertronicecu.com](http://www.powertronicecu.com)



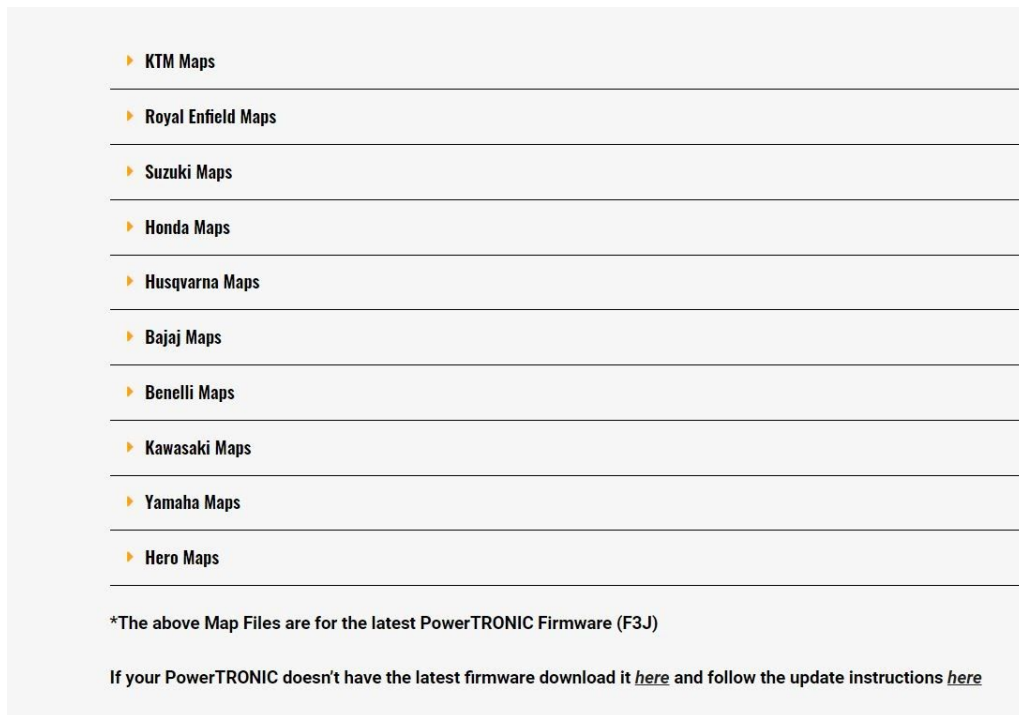
2. Click on Downloads



3. Scroll down and click on the Download Maps option below the PowerTRONIC maps section.



4. Select the Make and model of your bike from the list.



5. Click on the Download option under the make





6. Select the model and download the appropriate map.

## KTM Maps

▶ KTM Duke/RC 125

▶ KTM Duke/RC 200

▶ KTM Duke/RC 250

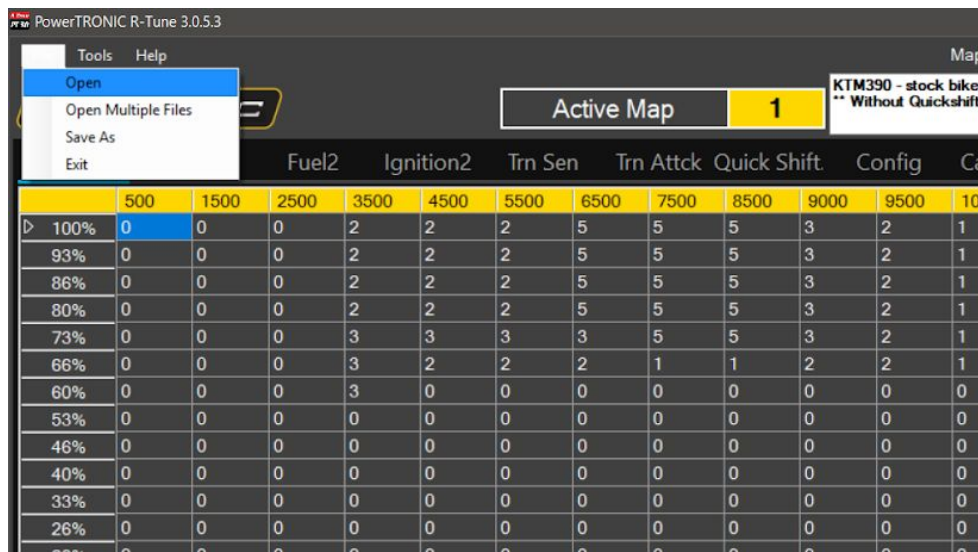
▲ KTM Duke/RC 390

- PowerTRONIC Map (With Quickshifter)
- PowerTRONIC Map (Without Quickshifter)
- PowerTRONIC Exhaust Map (With Quickshifter)
- PowerTRONIC Exhaust Map (Without Quickshifter)

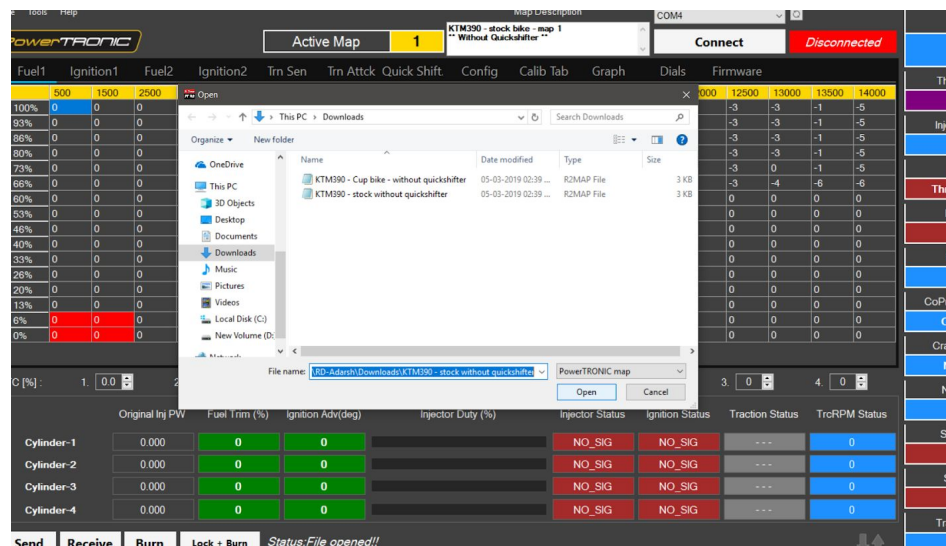
## 7. Burning a map to ECU

To load a new map file:

1. Connect the PowerTRONIC ECU to your Windows PC using the USB cable.
2. Open the R-Tune software.
3. Select the appropriate **COM** port number.
4. Click on **Connect**.
5. Click on **File** then **Open** (Refer the figure below)



6. Select the downloaded map file from the file manager.

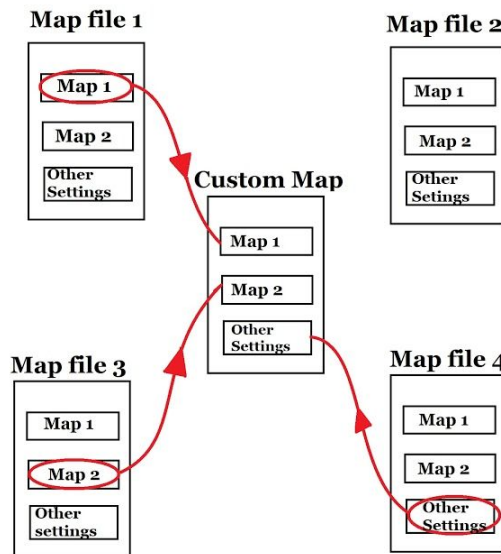


7. Click **Open**.
8. Click on **Send** and then **Burn**. [Make sure the bike is off before clicking **Burn**]

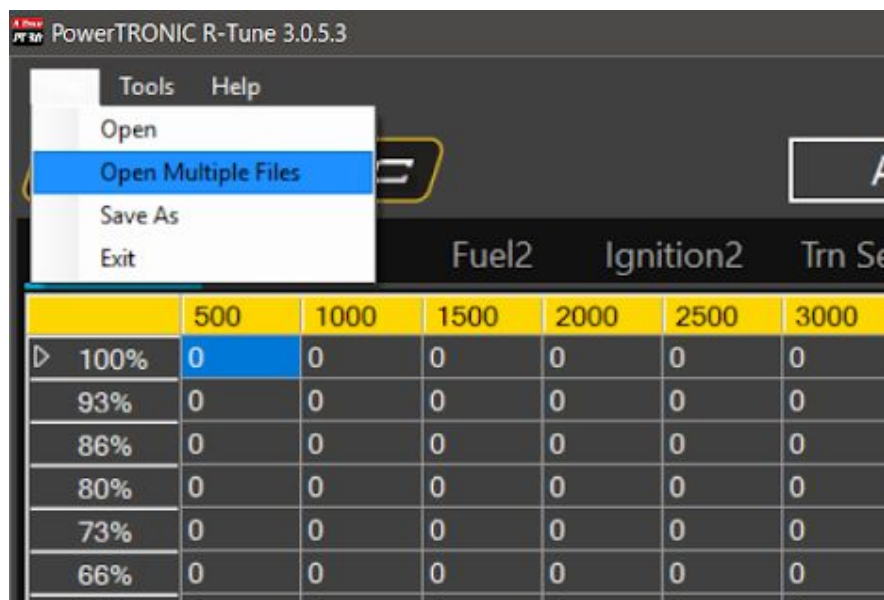


## 8. Map Mixing

You can develop a custom map file using the R-Tune software by combining the modes from different maps based on your requirements. (Refer schematics given below)

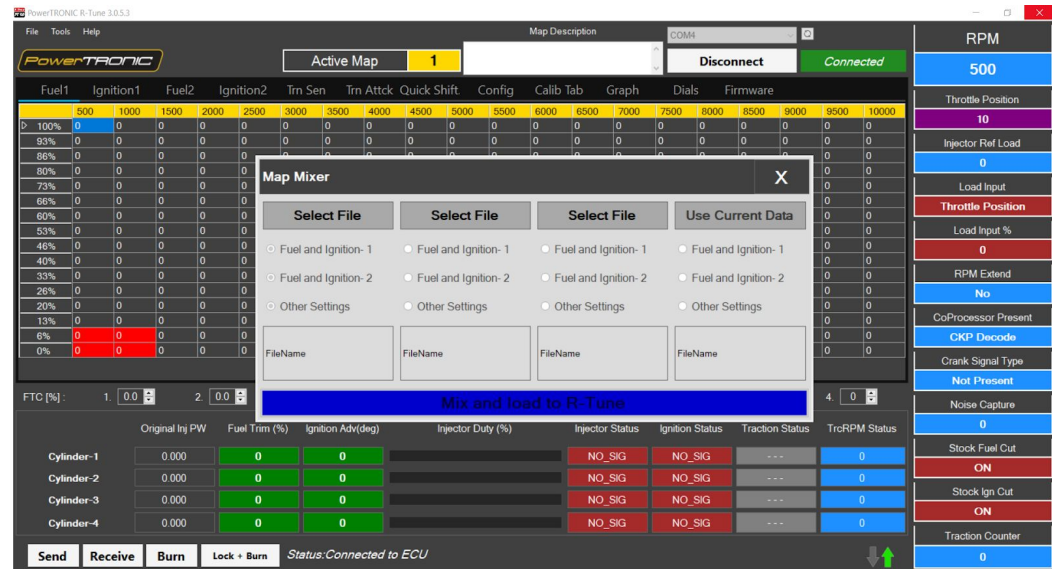


1. Open the R-Tune Software.
2. Click on **Connect** and then **Receive**
3. Go to **File**, Select **Open Multiple Files**

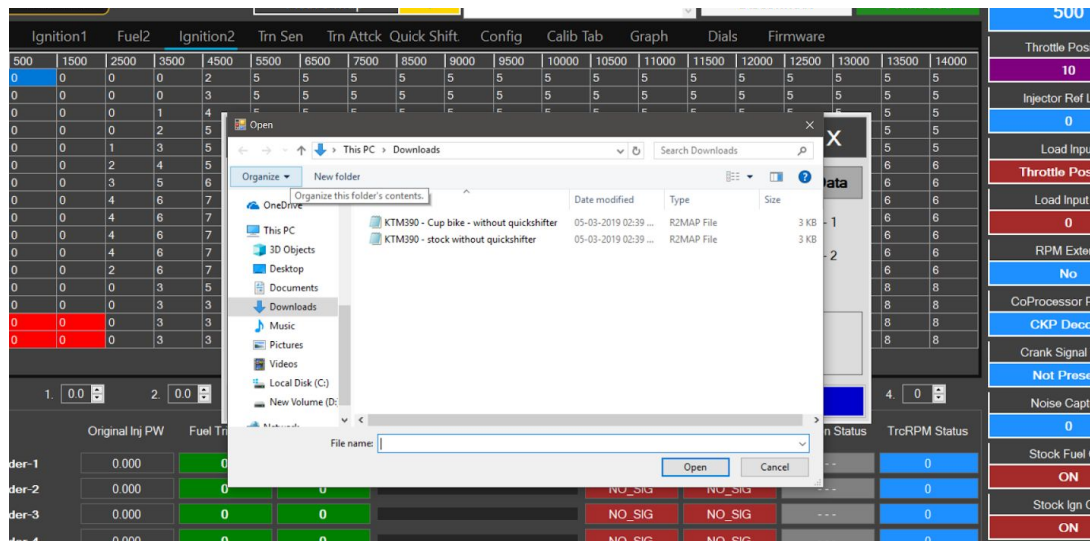


- The Map Mixer dialog box with four individual file settings will open.

**Note:** 'Use Current Data' section contains the 2 maps that are pre-loaded to the ECU.

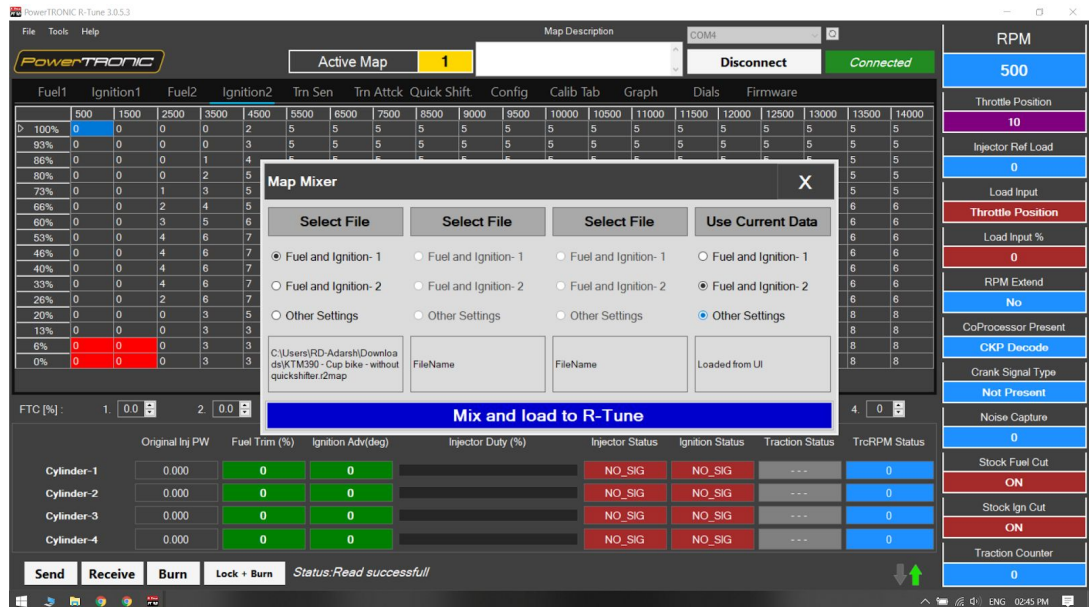


- Click on **Select File** option and select the map stored on your PC. (You can choose multiple maps for the 3 sections except for **Use Current Data** section). You can select any map by clicking on the **Fuel and Ignition -1/ Fuel and Ignition -2** depends on your preference.



- If you would like to choose between one of map that is preloaded on the ECU and one map of your choice, you can decide from the dialog box shown below

**Note:** Other settings contains data from other tabs of R-Tune. Ex: Config, Quick-Shifter, Traction Sensitivity, and Traction Attack.



7. Click on **Mix and load to R-Tune**.
8. Click on **Send** and then **Burn**. *[Make sure the bike is off before clicking **Burn**]*

---/End of Document/---