

## Maps, Switching and Mixing Procedure

<b>Document Version</b>	1	<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**

Call/Whatsapp: +91 99162 29292 / +91 80409 29292  
 E-Mail: [support@powertronicECU.com](mailto:support@powertronicECU.com)  
 Website: [www.powertronicECU.com](http://www.powertronicECU.com)

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# 1. Maps

A map file or simply a map 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.

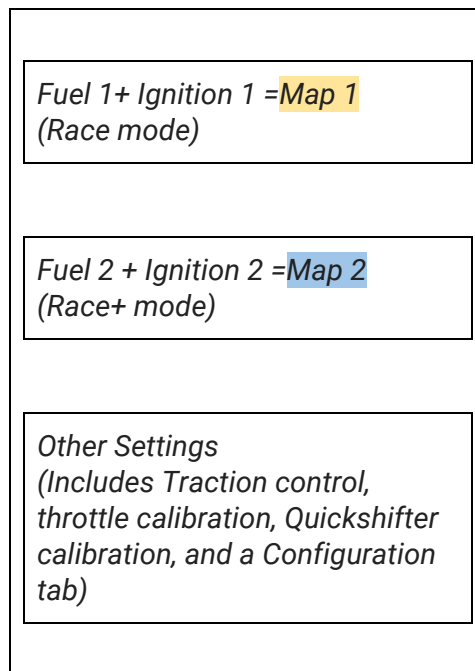
A PowerTRONIC map file has 3 parts:

1. Pre-tuned map 1
2. Pre-tuned map 2
3. Other settings

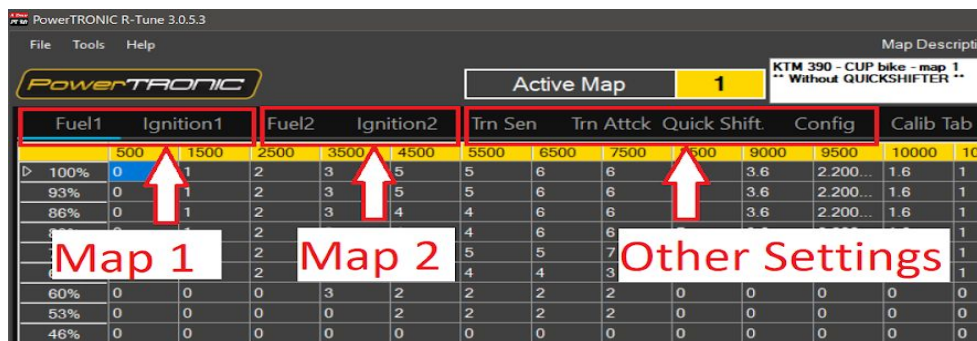
The PowerTRONIC ECU can store two pre-tuned maps. Diverse map files depending on your requirement can be downloaded from our website and loaded using the R-Tune software. (Explained later)

A schematic representation of a map file is given below.

*MAPFILE*



Refer to the R-Tune user interface below. The **Active Map** (currently map 1) would be displayed on the top of the software user interface.



## 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

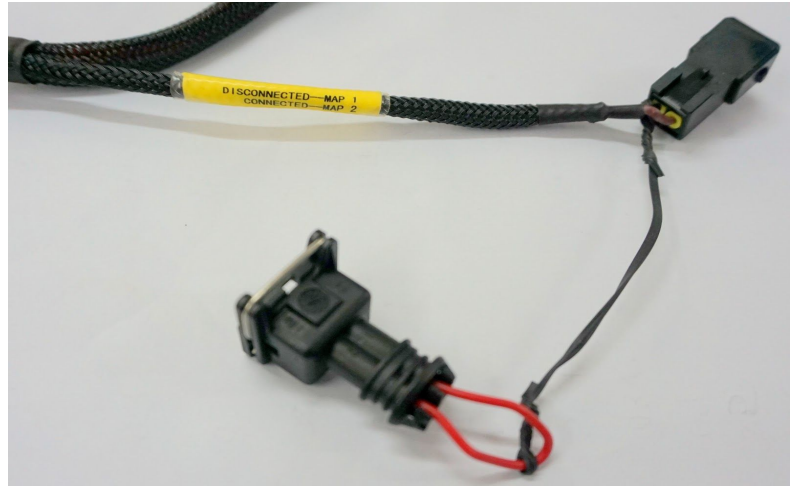


Fig B

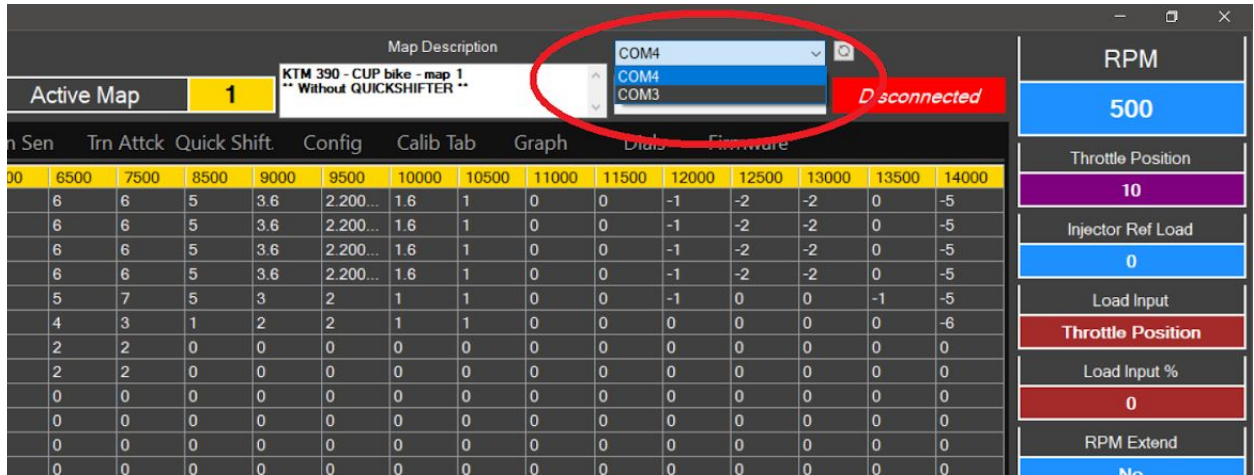
To verify which map is currently selected, you can also observe the **green LED** on the PowerTRONIC ECU.

One Blink = Map 1, Two Blinks = Map 2.

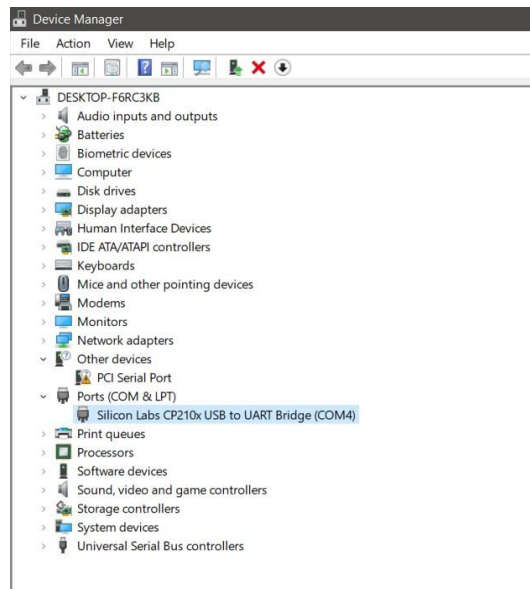
### 3. Reading the Map from the ECU

To read the map from PowerTRONIC ECU, use the R-Tune software. (Refer the R-tune manual for the R-Tune software)

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.

The screenshot shows the PowerTRONIC R-tune software interface. At the top, there are menu options (File, Tools, Help) and a 'Map Description' field containing 'KTM390 - stock bike - map 1 -- Without Quickshifter --'. Below this is an 'Active Map' dropdown set to '1' and a 'Connect' button (highlighted in red) next to a 'Disconnected' status indicator. The main area is a large table with columns for Fuel1, Ignition1, Fuel2, Ignition2, Trn Sen, Trn Attck, Quick Shift, Config, Calib Tab, Graph, Dials, and Firmware. The table contains numerical data for various throttle positions (100% to 0%) and RPM values (500 to 14000). Below the table are four input fields for 'FTC [%]' (1, 2, 3, 4) and four for 'ITC [deg]' (1, 2, 3, 4). A status bar at the bottom shows 'Status: Disconnected from ECU' and buttons for 'Send', 'Receive', 'Burn', and 'Lock + Burn'. On the right side, there is a vertical panel with various status indicators and buttons, 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', 'Stock Fuel Cut ON', 'Stock Ign Cut ON', and 'Traction Counter 0'.

[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 3.05.3 software interface. At the top, it shows 'Active Map 1' and 'Map Description: KTM 390 - CUP bike - map 1 - Without QUICKSHIFTER'. The main area is a fuel map table with columns for Fuel1, Ignition1, Fuel2, Ignition2, Trn Sen, Trn Attck, Quick Shift, Config, Calib Tab, Graph, Dials, and Firmware. The rows represent load percentages from 100% down to 0%, and columns represent RPM from 500 to 14000. Below the table, there are input fields for FTC [%] and ITC [dgr]. At the bottom, there are status indicators for 'Send', 'Receive', 'Burn', and 'Lock + Burn', along with 'Status: Connected to ECU'. On the right side, there is a vertical panel with various engine parameters like 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**

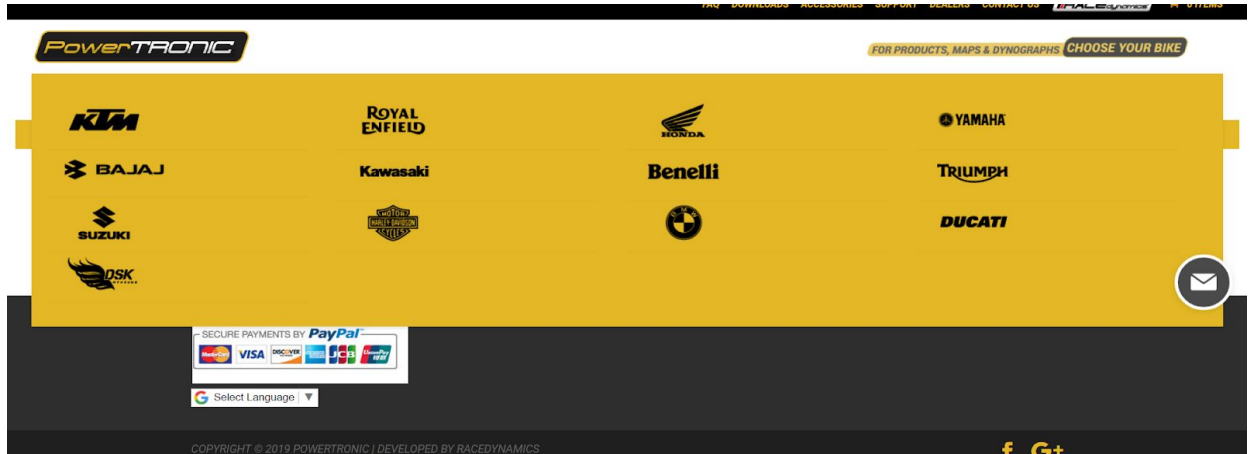
Click on the ignition tab. (refer figure below). The table contains the values to control ignition timing. The value '0' represents no changes to the ignition timing/spark which is basically the factory settings. Ignition timing/spark is always measured in terms of degrees. The positive value here indicates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

The screenshot displays the PowerTRONIC R-Tune 3.0.5.3 software interface. At the top, it shows the 'Active Map' as '1' and the map description as 'KTM 390 - CLIP bike - map 1'. The main area contains a large table for ignition mapping, with columns for RPM (500 to 14000) and rows for throttle positions (100% to 0%). Below this table are input fields for FTC [%] and ITC [dg]. At the bottom, there are status indicators for cylinders (Cylinder-1 to Cylinder-4) and buttons for 'Send', 'Receive', 'Burn', and 'Lock + Burn'. On the right side, a vertical panel shows various engine parameters like RPM (500), Throttle Position (10), and others.

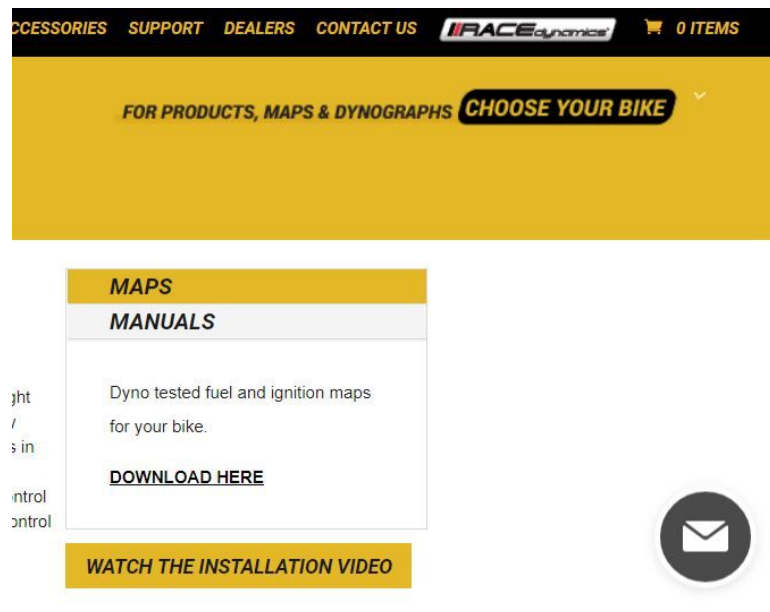
	500	1500	2500	3500	4500	5500	6500	7500	8500	9000	9500	10000	10500	11000	11500	12000	12500	13000	13500	14000
100%	0	0	0	0	2	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
93%	0	0	0	0	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
86%	0	0	0	1	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
80%	0	0	0	2	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
73%	0	0	1	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
66%	0	0	2	4	5	5	6	6	6	6	6	6	6	6	6	6	6	6	6	6
60%	0	0	3	5	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
53%	0	0	4	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
46%	0	0	4	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
40%	0	0	4	6	6	6	6	7	6	6	6	6	6	6	6	6	6	6	6	6
33%	0	0	4	6	6	6	6	7	6	6	6	6	6	6	6	6	6	6	6	6
26%	0	0	2	6	6	6	6	7	6	6	6	6	6	6	6	6	6	6	6	6
20%	0	0	0	3	6	6	6	8	8	8	8	8	8	8	8	8	8	8	8	8
13%	0	0	0	3	3	3	3	8	8	8	8	8	8	8	8	8	8	8	8	8
6%	0	0	0	3	3	3	3	8	8	8	8	8	8	8	8	8	8	8	8	8
0%	0	0	0	3	3	3	3	8	5	8	8	8	8	8	8	8	8	8	8	8

## 5. Downloading a map from the website

1. Go to <http://powertronic.racedynamics.com/>
2. To select a bike specific map file, navigate to bike specific page by moving the cursor to **CHOOSE YOUR BIKE**.



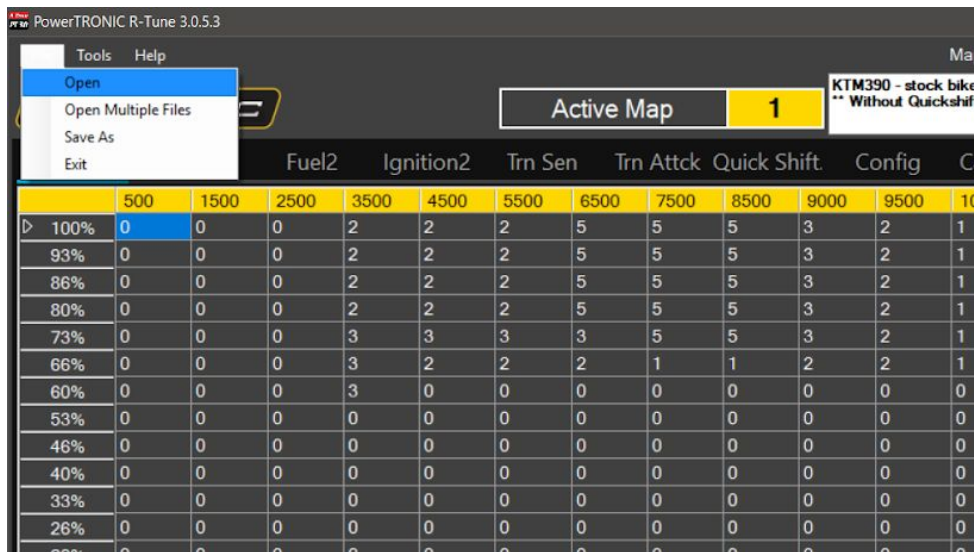
3. Select your bike model, Click on **MAPS** and then click **DOWNLOAD HERE** (refer the figure below).



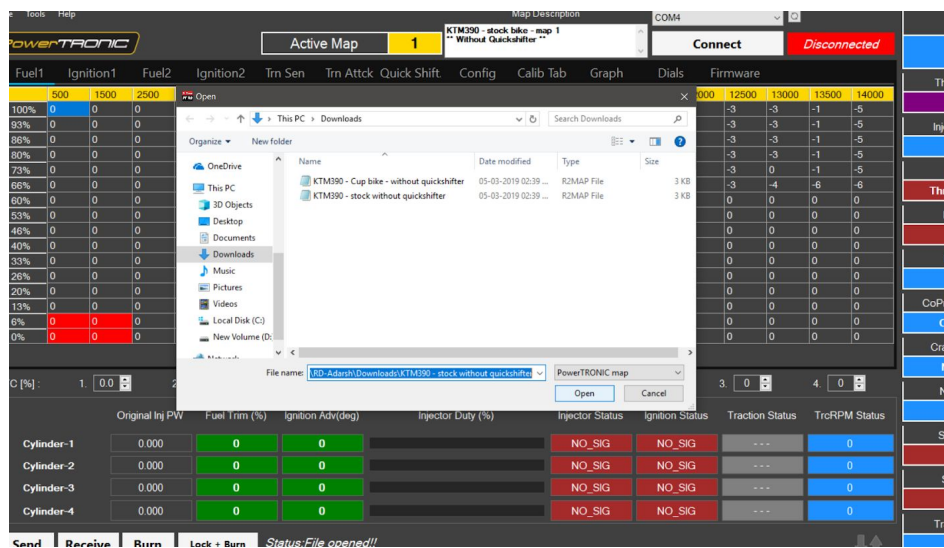
## 6. Burning a map to ECU

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)



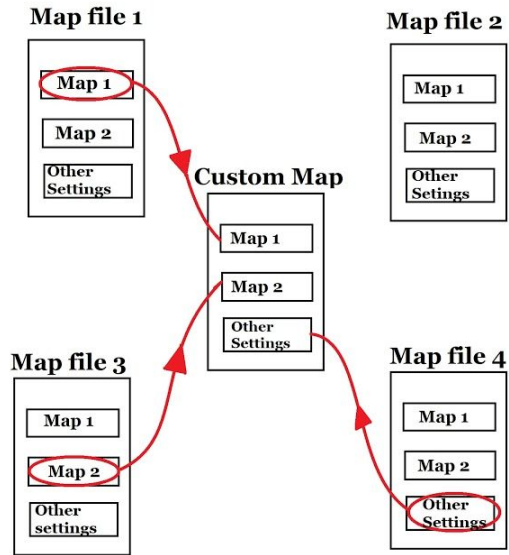
6. Select the downloaded map file from the file manager.



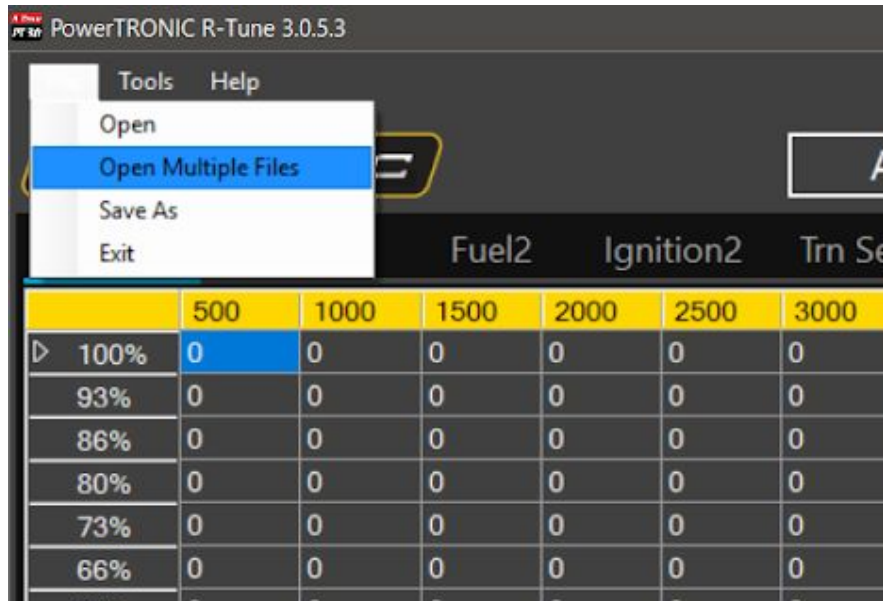
7. Click **Open**.
8. Click on **Send** and then **Burn**. [Make sure the bike is off before clicking **Burn**]

## 7. 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)

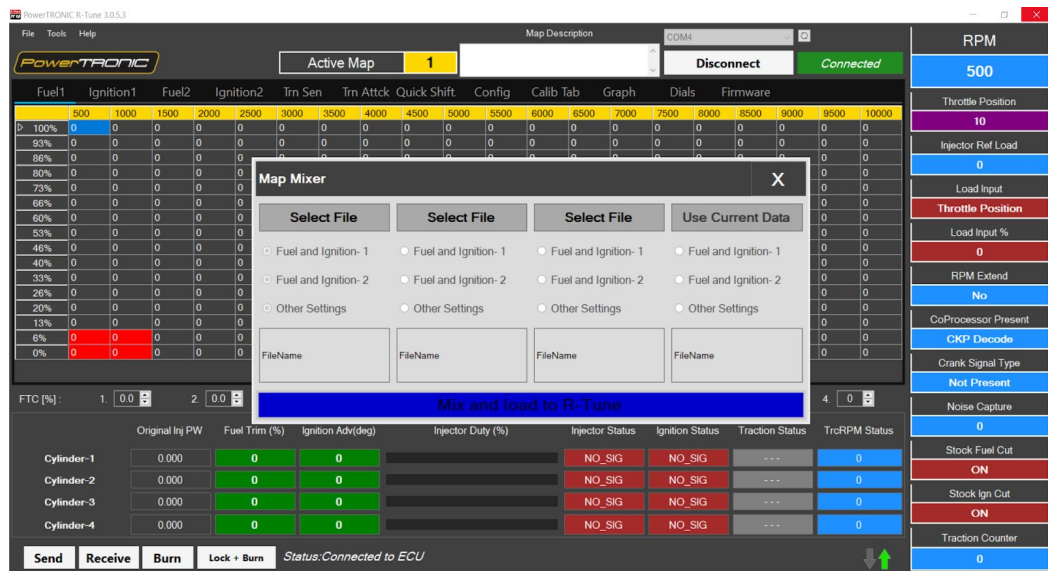


1. Open the R-Tune Software.
2. Click on **Connect** and then **Receive**
3. Go to **File**, Select **Open Multiple Files**

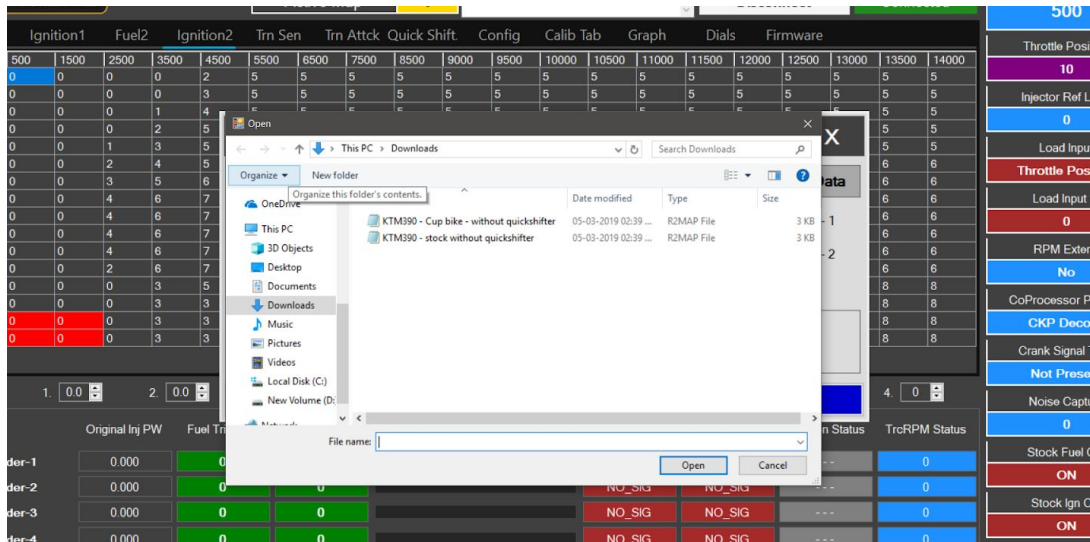


4. The Map Mixer dialog box with four individual file settings will open.

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

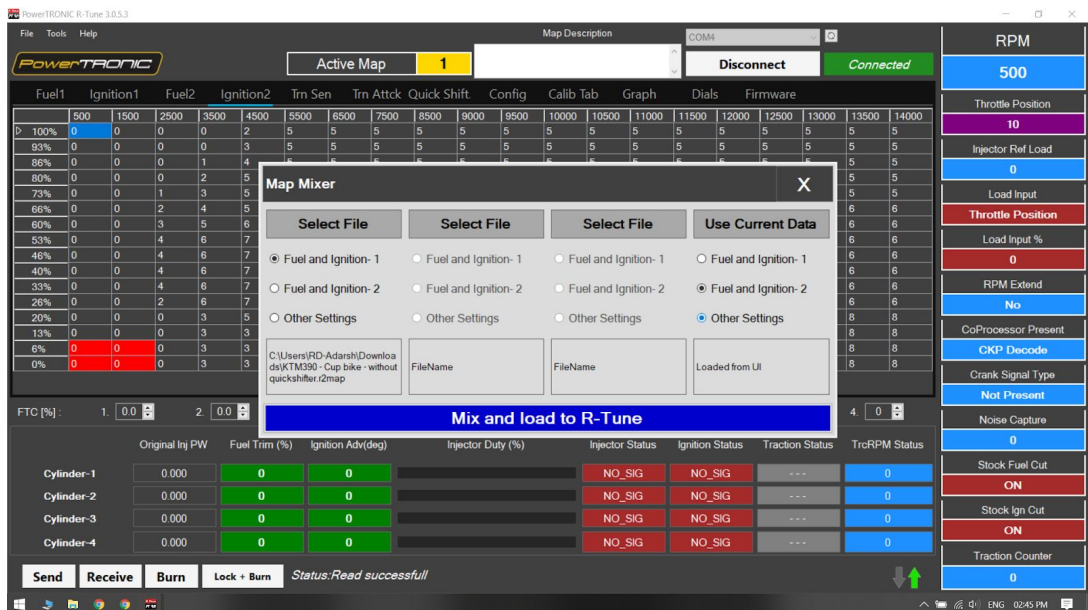


5. Click on **Select File** option and select the map stored on your PC. (You can choose multiple maps for the 3 sections except for **Use Current Data** section). You can select any map by clicking on the **Fuel and Ignition -1/ Fuel and Ignition -2** depends on your preference.



- 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.



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

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