Android Optimiser for MyECU

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This document outlines the use and features of the Android Optimiser for MyECU, herein referred to as the App. The reader should have a working knowledge of Android as this document does not describe how install the App or copy files to/from the directory used by the App.

Current limitations

Connecting to MyECU must be done within one minute of turning on MyECU (This is only for the early RN42 based Bluetooth dongles. Later dongles based on the HC05 don't have this limitation).

The App will work in either landscape or portrait mode but will not switch between them.

All related files, maps files and log files, reside in a single directory created in the root of the

normal storage area. This can vary depending on the device. On one of my devices it is /storage/sdcard0/MyECU on another it is /storage/emulated/0/MyECU. I recommend installing a good file manager application that allows easy navigation. I use one called Ghost Commander which even lets you get to remote storage but you can use anything that takes your fancy.

First time connection

MyECU will have shipped with a bluetooth dongle. The other end of the cable connects to the MyECU.

When the MyECU is powered there will be a flashing red LED on this dongle. When a successful connection is made there will be a solid green LED.

The first thing to do is to pair the bluetooth dongle to your device. This can be done either with your device's standard bluetooth software or in the App. When asked for a PIN, use 1234. The bluetooth dongle will identify itself as RN*, for example RNBT-B2D6*.

Start the Android Optimiser and from the menu select "Connect a device". If you previously paired, you will see it listed, otherwise select "Scan for devices". Fingers crossed you should see the green LED ** and the App will show real values.

From now on the App will automatically try to connect to the MyECU.

* The later HC05 dongles will identify as MyECU

** The HC05 doesn't have a green LED. The flash rate of the RED led will change

App Start

The App will display the following screen on start. The last previously loaded or saved map is reloaded from file. A connection attempt is made to MyECU using previous connection data.

 A new log file is automatically created in the MyECU directory (where all logs and maps are kept). Its name has the time as part of the name for identification.
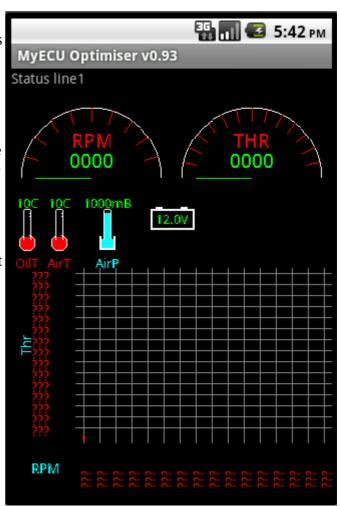

The initial numbers visible at this stage are just fillers and do not reflect any real values
The screen elements from top to bottom and left to right are
App name and version,
Status line for various messages,
Tacho display for engine RPM and similar for the throttle, Oil/Coolant temperature, Air temperature, Air pressure, Battery voltage,
o2 voltage/o2 correction graph (not yet visible),
a grid for displaying a trail indicating engine

operating point and rich/lean indication (if running in closed loop mode)

The ??? on the axis are an indication that a map is not loaded. You should upload the map from the MyECU and save the map file on the device.
This screen does not respond to touch and all access features is via the Android menu key.

Expected typical use cases

Connecting to MyECU

The recommended way is to turn on the ignition, wait 10 seconds, then launch the App. The App will automatically load the last map and connect to MyECU. If the connection fails you can either go to the menu and select connect or exit the App and try again.

Disconnecting from MyECU

You can either turn off the ignition or exit the App first but turning the ignition off first has benefits as the next use case illustrates.

Updating the map after a ride

Connect to the MyECU and start the bike. Verify the App is still connected after the start. I usually then blank the display (the App should still be running) and pocket my android phone. Do a ride of 30 minutes to an hour.

Turn the bike off but keep the App running. You should see the grid populated with suggestions. Adjust the map by accepting the suggestions or otherwise, then go back to main screen and save the map to a new file and then exit the App.

Then connect to MyECU and download the map to the ECU (the App will automatically load the latest map)

How best to ride

The closed loop correction is a relatively slow adjustment so it is best to be extra smooth in your riding technique. Try and keep throttle movements slow and accelerations low. Ride as if cruising and not racing. Try and get a good coverage across the map by varying speed and throttle.

A ride down the freeway at constant speed will not be useful. A hilly winding road is better.

Don't do this while watching the App. Keep your eyes and mind on the road.

The menu

On press the menu key a menu is presented. The exact entries displayed can vary because of the actual context. The menu items are

Enable Bluetooth

Turns on the bluetooth functionality. This item is only displayed if bluetooth is not enabled.

Connect a device

This establishes a connection to MyECU. This item is not displayed if a bluetooth is not enabled or a connection already exists.

Load map file

This will read in a map file that is already stored in the MyECU directory into the App's memory. A list of maps is first presented.

Save map file

This will save the currently loaded map to a file in the MyECU directory. The name of the new map file must be entered next. Existing files are not displayed This item is not displayed if no map has been loaded.

Get map from ECU

This will load a map from the ECU into the App's memory. A progress bar is displayed along with status line updates. This item is not displayed if a connection to MyECU has not been established.
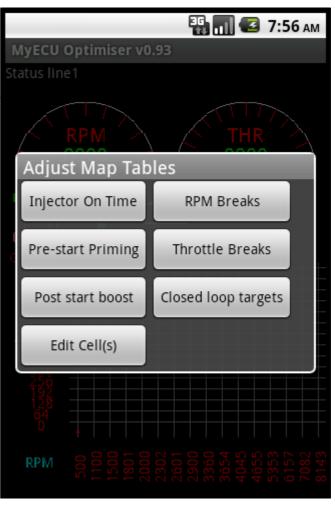
Send map to ECU

The App's memory copy of the map is transferred to MyECU. A progress bar is displayed along with status line updates. This item is not displayed if a connection to MyECU has not been established.

Logging options

This allows the selection of what is logged (mainly to reduce file size) and allows for the deletion of all other log files It is recommend that all logging is enabled when reporting problems with the App.

Adjust map

This allows adjustment of many of the maps parameters. Another dialogue. is presented allow selection of various

Injector On-time

The injector on time is a time that allows for the sluggish opening and closing characteristics of the injector. The table is against voltage. The value is a time in microseconds. A lower voltage gives a more sluggish opening than a injector.

The dialogue. is scrollable to allow access to fields not displayed.

If the dialogue. is exited without pressing "Save Changes" the changes will be discarded

Pressing "Save Changes" only affects the in memory map. Changes must be explicitly saved to file or to MyECU from the main dialogue.

Prime Table

This table is very important in starting the bike. While the RPM is less than the first column (500 RPM), i.e. when turning on the starter motor, the Prime table is used to determine the amount of fuel. The value here represents the number of milliseconds the injector is fired for EACH cycle. The values used depend on the oil/coolant temperature. NOTE: Throttle is ignored while cranking.

The dialogue. is scrollable to allow access to fields not displayed.

If the dialogue. is exited without pressing "Save Changes" the changes will be discarded

Pressing "Save Changes" only affects the in memory map. Changes must be explicitly saved to file or to MyECU from the main dialogue.
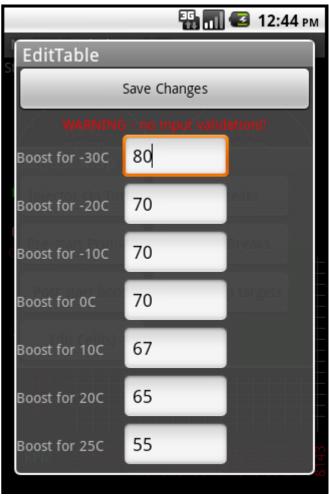
Boost table

Once the bike fires, the RPM will increase to more than the first column (500 RPM).At this point the fuelling is determined from the map as is normally the case. There is however an initial boost above what the map says. This table, also indexed by oil/coolant temperature, is a percentage % boost applied to the map. This boost is short duration and decays to 0 in about 20 seconds. If you find the bike fires readily but doesn't keep running, this is the table to adjust. NOTE: The map value used is already corrected for air temperature and pressure and for oil/coolant temperature before being boosted by this table.

The dialogue. is scrollable to allow access to fields not displayed.

If the dialogue. is exited without pressing "Save Changes" the changes will be discarded

Pressing "Save Changes" only affects the in memory map. Changes must be explicitly saved to file or to MyECU from the main dialogue.

Oxygen sensor target

These numbers represent the voltage that the sensor provides. The voltage must be between 0 and 5 volts. 0 volts is a special case and means go open loop. If the gas sensor gives an inverted output (higher voltage = leaner mixture), then voltages should all have a negative sign. These 8 values are referenced from the map by their index (0-7, 0 is the bottom number).

The dialogue. is scrollable to allow access to fields not displayed.

If the dialogue. is exited without pressing "Save Changes" the changes will be discarded

Pressing "Save Changes" only affects the in memory map. Changes must be explicitly saved to file or to MyECU from the main dialogue.

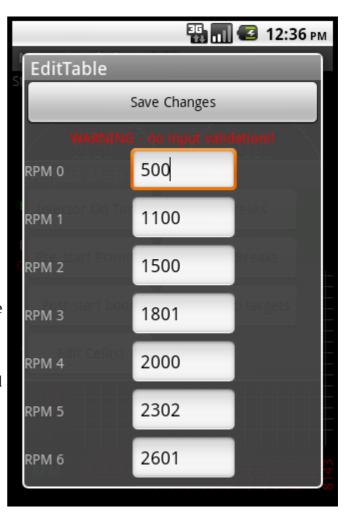|	
	12:40 PM
EditTable	
Save Changes	
WARNING - no input validation!!	
O2[0] (volts)	0.00
O2[1] (volts)	-3.00
O2[2] (volts)	-2.75
O2[3] (volts)	-2.40
O2[4] (volts)	-2.25
O2[5] (volts)	-2.00
O2[6] (volts)	-1.75

RPM Breaks

The 500 RPM is needed for starting so don't think you can remove this. The 1100 RPM column should be set to match your idle speed. There is normally little reason to change these values. You may want to concentrate the RPM columns around the motors torque peaks or troughs to increase the accuracy of mapping.

The dialogue. is scrollable to allow access to fields not displayed.

If the dialogue. is exited without pressing "Save Changes" the changes will be discarded

Pressing "Save Changes" only affects the in memory map. Changes must be explicitly saved to file or to MyECU from the main dialogue.

	12:36 PM
EditTable	
Save Changes	
WARNING - no input validation!!	
RPM 0	500
RPM 1	1100
RPM 2	1500
RPM 3	1801
RPM 4	2000
RPM 5	2302
RPM 6	2601

Throttle Breaks

The dialogue. is scrollable to allow access to fields not displayed.

If the dialogue. is exited without pressing "Save Changes" the changes will be discarded

Pressing "Save Changes" only affects the in memory map. Changes must be explicitly saved to file or to MyECU from the main dialogue.

Cell selection

The dialogue. at right appears when the button Edit Cells is clicked.

If you have completed a ride or replayed a log file with closed loop enabled, the grid may be populated with suggestions. These can be selected by pushing the first button.

When "Accept selected suggestions" is pressed each suggestion will be presented with some metrics so that each can be accepted or ignored.

The Select all button will select all the cells and then change itself to become Deselect button which can be used to clear all selections.

Cells are selected or deselected by pressing them in the grid but this can be done in a number of ways according to Sel Mode.
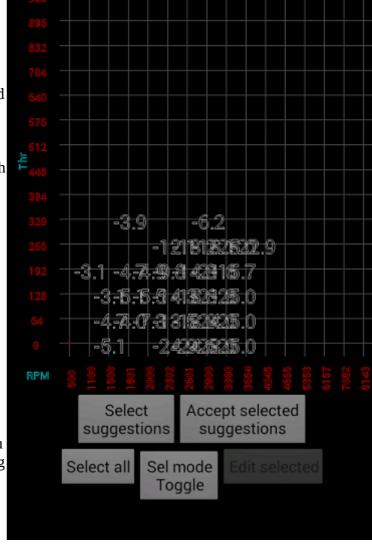
The default is Toggle where the selection is a click on click off. Clicking Sel mode can be used to change to Select or Deselect. These are convenient ways to select a region of the map. For instance you can select the entire top half of the map by changing the mode to select and then painting with your over the top until all required cells are selected.

Changes made only affects the map in the App's memory or the MyECU volatile buffer. Changes must be explicitly saved to file or to MyECU from the main dialogue.

Before you decide whether to accept suggestions, have a look at the numbers presented. Those above occurred on a first ride. I can see that those in the lower left are generally about -5 and those in the lower centre are -25%! I would not accept suggestions at this stage but instead make some more general adjustments. First I took 5% off every cell. Then I took an additional 10% off every cell except for the lower left. You want to pull the map in large chunks first until you start to see a mix of plus and minus values before using the suggestions.

When you accept suggestions you will be presented with the dialogue. below for each cell that has a suggestion. The title shows the cell index (2,3) and the correction that will applied, -5.1, if you choose to accept. The value is an average of all the suggestions that were made for that cell.

The line in the dialogue. shows how many times a suggestion was made and also the minimum and maximum corrections that were suggested. This should be used to determine your confidence to accept or not accept. Lots of suggestion is good especially if the minimum and maximum are also similar. Also consider the changes being made to adjacent cells.
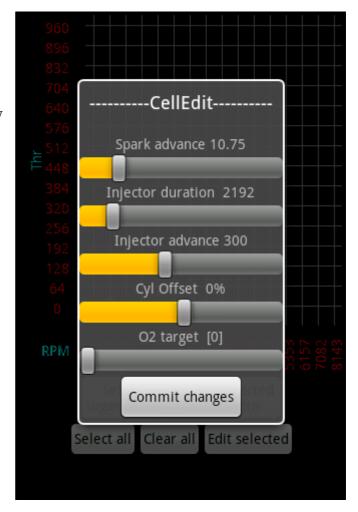
When editing the selected cell(s) there is an important distinction made if there is one cell selected or more than one.

When a single cell is selected, the sliders show the absolute values of the cell. As sliders are moved they are communicated directly to the MyECU.

This can be used to tune idle for instance.

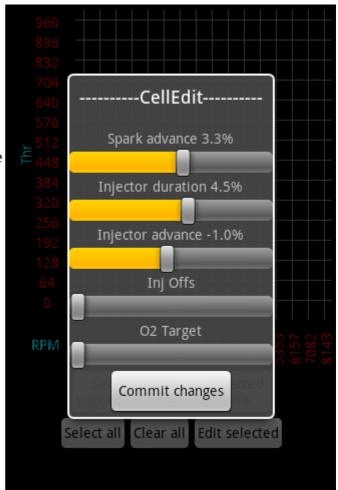Commit changes must be press to put the changes into non-volatile MyECU storage

When multiple cells are selected only the relative change is displayed.
There is no communicating of changes to the ECU.

When commit is pressed changes only affect the in memory map. Changes must be explicitly saved to file or to MyECU from the main dialogue.
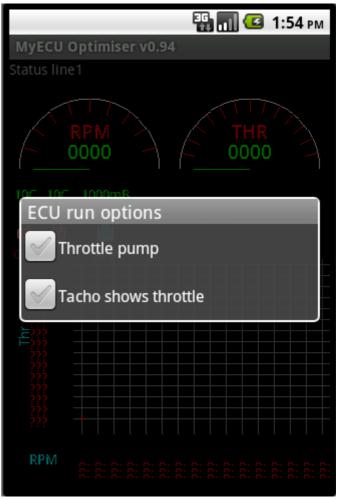
ECU Run Options

Throttle pump emulation

This is normally enabled however the ECU does not enable this option until the bike has started. Therefore if you want to disable you need to do this after the bike has started.

This setting is not persistent

Tacho shows throttle

On those bikes where the Tacho is driven by the ECU, this option allows the Tacho to display the throttle position rather than RPM.

Logging Options

This dialogue. selects what will be placed in the log file and whether log files are archived. Unless your device is limited in space you should leave all the options set. A new dialogue. file is created every time the App is started so you should periodically clean them out.

Raw ECU data

This is selects the hexadecimal structures output from the ECU. This is the minimum required to log a ride.

Formatted ECU data

This is a readable form of the Raw ECU data.

User Interaction

This is gives key presses, menu selections.

Auto-tuning

This is output from the auto-tuning logic and is really just for debugging. It is not required for the auto-tuning to work

Android debug

This is miscellaneous debug to help with problem determination.

Preserve old log files

When deselected all log files are deleted when the App starts. It is recommended to keep this set to prevent loss of important logs.

Delete all other log files

When selected all log files are deleted except for the one currently being written