

XV Tuner

V2.0.0.0

Programming and Diagnostic software
for use with Aprilia SXV/RXV motorcycles
equipped with the Walbro ECUC-1 ECU

A product of Western Racing Developments
www.westernracingdevelopments.com

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What is XV Tuner?

XV Tuner is a package consisting of an interface cable and PC software developed to provide owners the ability to load maps, set tuning parameters and diagnose problems within the ECU. The XV Tuner package meets, and in many ways, exceeds the programming capabilities of an authorized Aprilia service center.

Some of the most commonly used features are:

1. Set the MIN and MAX TPS values within the ECU.
2. Adjust Fuel Offset value to fine-tune a loaded map.
3. Write a different map to the ECU.
4. Read an existing map from the ECU.
5. Reset fault codes in the ECU.

There is no tool more valuable to a mechanic working on a modern motorcycle than a tool that allows access to monitor and modify the inner workings of the ECU. XV Tuner provides all of the needs of such a tool. No longer will you have to question if a particular sensor is functioning correctly or have to return to a service center for fuel adjustments or map changes.

CAUTION: There are inherent risks with modifying the parameters within the ECU. Improper setup may lead to engine damage or personal injury. Caution must be taken to ensure that changes being made are safe and understood prior to applying.

Getting Started...

Before you can use XV Tuner, it must be installed on a suitable machine capable of running the software package. The package consists of an interface cable driver and the XV Tuner software itself. The interface cable will NOT be able to communicate with the ECU if the interface cable driver has not been loaded correctly or is non-functional.

The computer must meet the following minimum system requirements or the software installation will terminate:

1. Windows Operating System – Windows 7 (32 or 64 bit), Windows Vista (32 or 64 bit), Windows XP Professional (32 or 64 bit) with SP 3.0.
2. Microsoft .net framework v2.0 and .net framework v4.0 installed.
3. Intel or AMD CPU – 1 GHz.
4. 100 Mb free Hard Drive space available.
5. 512 Mb RAM.
6. 1 available USB 1.0 port.

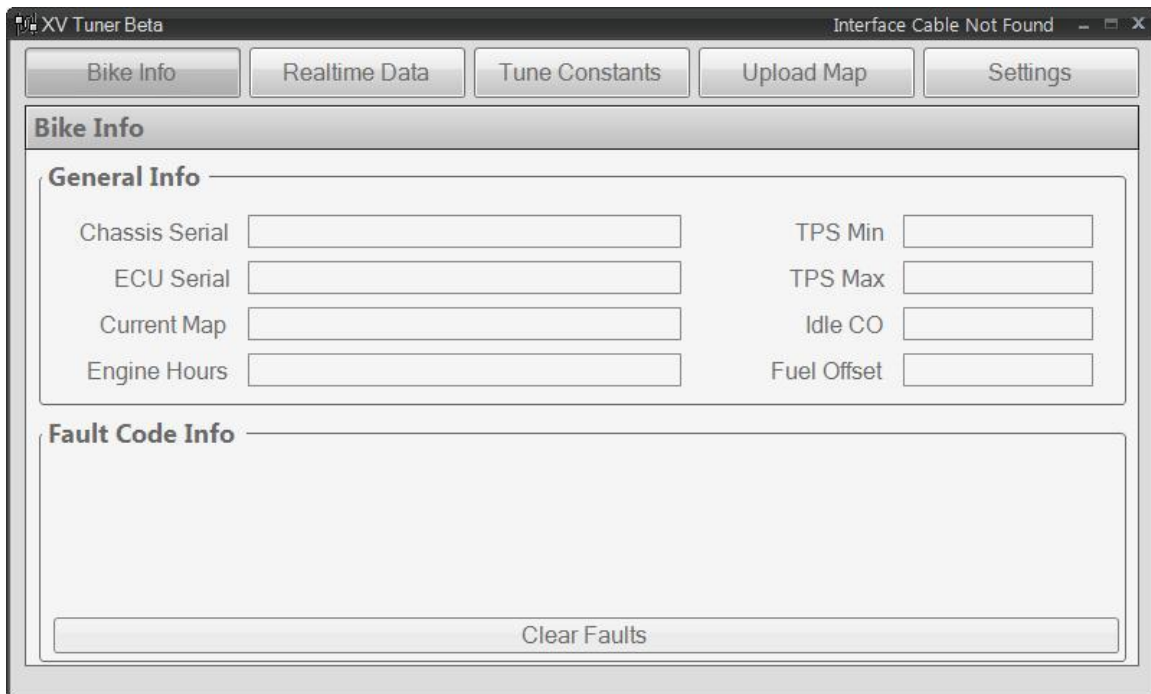
The installation must be performed in the proper order to be completed successfully. DO NOT plug the interface cable into a USB port until after the XV Tuner software has been installed completely. DO NOT connect the interface cable to the ECU until both the XV Tuner software and the interface cable driver have been successfully loaded and verified.

Begin the installation of the software package by executing the installation program. The XV Tuner software will be installed on the host computer if the computer passes the requirements of the software package. Some additional software may be required before XV Tuner will install, depending upon the host computers currently installed programs, therefore Internet connectivity is recommended during the software installation process. If required, the installation software will identify the additional software that must be installed prior to attempting to install XV Tuner again. Any required software will be available for download from the Internet and must be installed. If no additional software is required, the installation will complete and an XV Tuner icon will appear on the desktop and a folder will be created in the start menu.

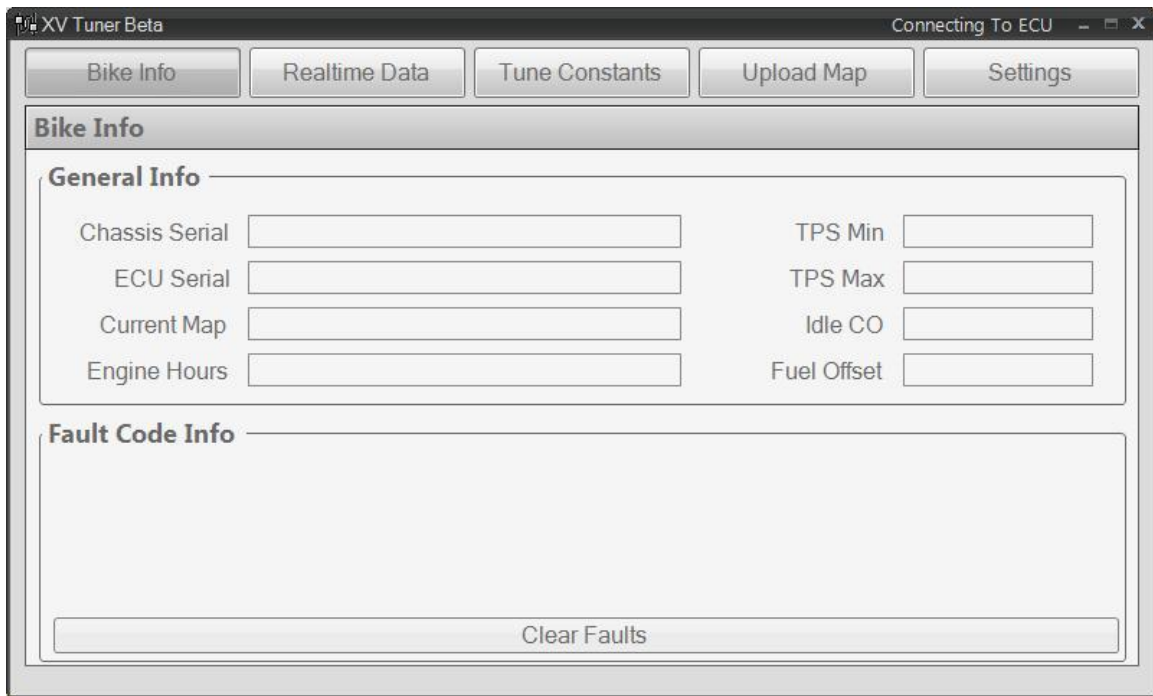
Once the installation of XV Tuner has been completed successfully, the drivers for the interface cable must be loaded. To load the interface cable driver, plug the interface cable into an available USB port. It may be necessary to direct the installation program to the Western Racing Developments folder in the Program Files directory to locate the driver files.

After the interface cable driver installation is complete you should confirm everything has loaded correctly by starting the XV Tuner program and verify that the cable is detected by looking at the upper right hand corner of the program screen.

If the interface cable is not functioning correctly or not plugged into a USB port, you will see a message stating “Interface Cable Not Found” as seen in the following image. Verify that the cable is connected to a USB port. The interface cable must be functioning prior to continuing.



If everything is functioning correctly you will see a message stating “Connecting To ECU” as seen in the following image.



With the XV Tuner software recognizing the interface cable, you are ready to connect to the ECU!

Connecting To The ECU...

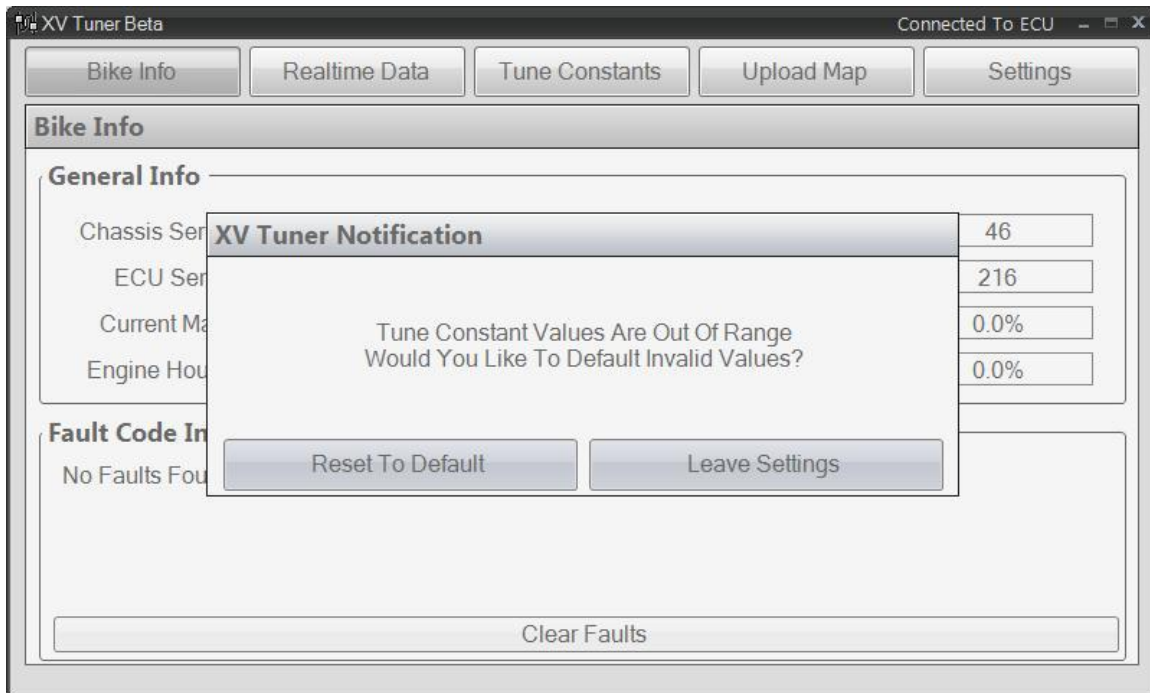
The interface cable will connect to a plug located on the left hand side of the motorcycle just behind the radiator and is usually tied to the frame. The connector will have a sealed cover installed on the connector to prevent the connector from debris or water damage. The cover must be removed to connect the interface cable and should be replaced after disconnecting the interface cable.

Once the interface cable has been connected, the ground wire (clip lead) from the interface cable must be connected to the motorcycle for successful communications. The ground wire is long enough to allow it to be connected at the main ground wire at the countershaft cover, but may be connected at any grounded part, including directly to the battery negative terminal.

With the XV Tuner software running and the “Connecting To ECU” message displayed, the key may be rotated to the “ON” position. If communications are successful, the message on the top right hand side of the program screen will change to “Connected To ECU” as seen in the following image. If the message does not change from “Connecting To ECU” the interface cable connections should be verified.



When connecting to an ECU, the XV Tuner software will verify that Tune Constant values are within a normal range. If values outside of the normal range are detected a notification box will appear requesting the desired action to take as seen in the following image.



Reset To Default will reset the ECU tune constant out of range to the default value. Selecting Leave Settings will leave the current values in the ECU, you will not be able to change the out of range tune constants with the XV Tuner software. It is highly recommended that you reset the tune constants should you be prompted to do so. Using values outside the normal range can lead to serious problems.

After clearing the notification, if present, you have completed all of the necessary steps and are now communicating with the ECU and are ready to start using the software!

Fall Sensor Note...

The fall sensor, or tip over switch as it is commonly known, is located inside the airbox between the throttle bodies. With many of the maps it is used to disable the ECU in the event of a crash or tip over. There is no display of the status of the fall sensor within XV Tuner v2.0.0.0 as was found in previous versions. It was omitted because of the impact the sensor has on the operation of the ECU communications.

For maps using the fall sensor, if the fall sensor input falls outside of the normal operating range, even momentarily, the ECU will begin a countdown and disable the ECU outputs. XV Tuner communications will be lost with the ECU and the ECU will remain non-functional until the ECU power is cycled. If the fall sensor input is not within the normal operating range during ECU power up, the countdown will begin immediately. Without having a means of viewing the status of the fall sensor within XV Tuner v2.0.0.0 it is very important to understand and recognize the symptoms of a fall sensor trip if it exists. If used, the fall sensor **MUST** be operating normally to use XV Tuner. The symptoms are as follows:

1. XV Tuner running.
2. Interface cable connected and grounded.
3. Turning ignition switch on establishes communications with the ECU.
4. After five seconds, the ECR relay de-energizes and communications are lost with the ECU.
5. Cycling the ignition switch re-establishes communications for another five seconds.

If a fall sensor trip is suspected, there are several options to assist in proving the fall sensor trip exists. The options include:

1. Start an older version of XV Tuner and monitor the Realtime Data screen while turning the ignition switch on. Fault will be displayed if the sensor input is out of the normal operating range.
2. Load a map using the Failure During Writing File tutorial that is known to not use the fall sensor and verify normal operation.

3. Test the fall sensor with suitable test equipment. This option would require advanced skills and knowledge of the sensor operation.

Using The Software...

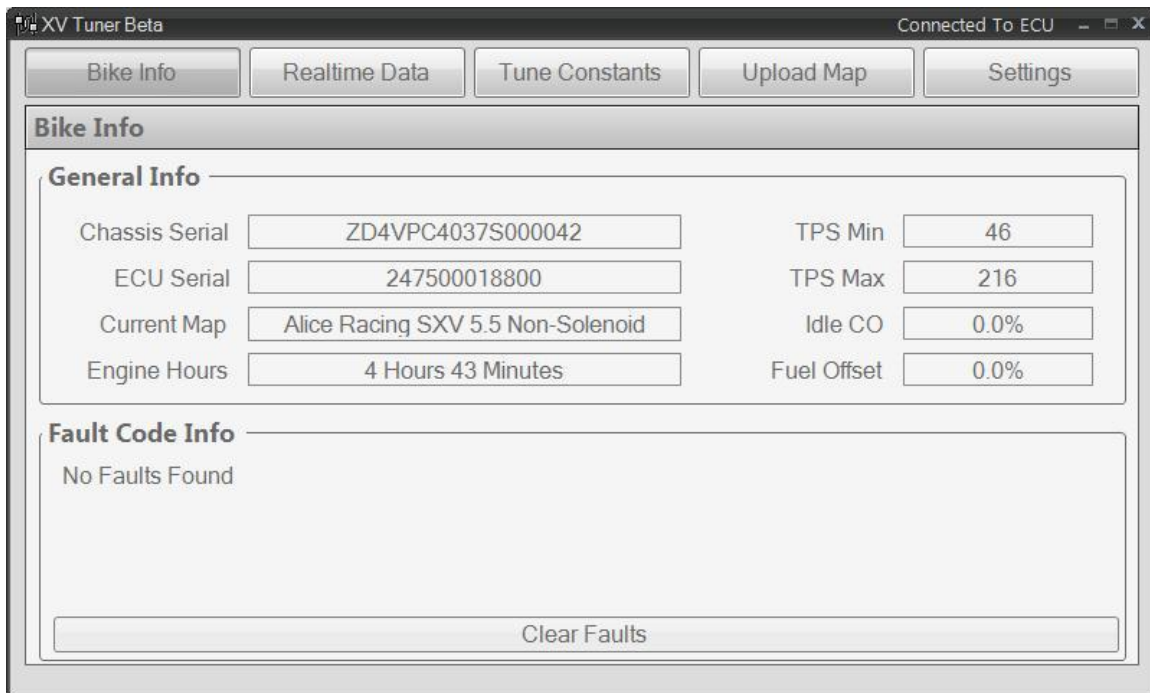
The XV Tuner software has had its features broken up into five main screens. Each screen will be broken down individually to explain the data presented within each field. Unless the software is communicating with the ECU, most fields will not contain any data.

The five main screens are:

- Bike Info,
- Realtime Data
- Tune Constants
- Upload Map
- Settings

Each screen has its own purpose/features. It is important to note that XV Tuner is constantly communicating with the ECU. If the user is “flipping” between screens very quickly (less than 1 second on each screen) it is possible for XV Tuner and ECU can lose sync with each other. If this happens random data can be display. If this happens re-start XV Tuner.

Bike Info Screen...



The Bike Info screen displays general info read from the ECU about the motorcycle the ECU was configured for and some current operating parameter values. Values are non-editable. The Bike Info screen also displays and allows the resetting of any existing fault codes read from the ECU. Information provided includes:

1. Chassis Serial: a display of the serial number of the chassis that the ECU was programmed for by Aprilia. This will match the VIN of the motorcycle unless the ECU has been replaced in the past.
2. ECU Serial: a display of the ECU serial number read from the ECU.
3. Current Map: a display of the loaded map identifier read from the ECU. Alice Racing maps will display the full version name. All other maps will display only the map file name or map number.

4. Engine Hours: a display of the total accumulated time that has elapsed with the engine turning greater than 700 RPM.
5. TPS Min: a display of the currently loaded TPS Minimum value being used by the ECU.
6. TPS Max: a display of the currently loaded TPS Maximum value being used by the ECU.
7. Idle CO: a display of the currently loaded Idle CO value being used by the ECU.
8. Fuel Offset: a display of the currently loaded Fuel Offset value being used by the ECU.
9. Fault Code Info: a list of existing fault codes read from the ECU. If no fault codes exist, the message “No Faults Found” is displayed.
10. Clear Faults: a button that may be used to initiate clearing of any existing faults that may have been read from the ECU.

Fault codes are not identified in the Fault Code Info section as being either an existing condition or a stored fault. An existing fault condition will have the “Check Engine” light illuminated on the dash display, while a stored fault will not. The following image shows how faults read from the ECU will be presented in the Fault Code Info section of the screen.

XV Tuner Beta Connected To ECU

Bike Info

General Info

Chassis Serial	ZD4VPC4037S000042	TPS Min	46
ECU Serial	247500018800	TPS Max	216
Current Map	Alice Racing SXV 5.5 Non-Solenoid	Idle CO	0.0%
Engine Hours	4 Hours 43 Minutes	Fuel Offset	0.0%

Fault Code Info

P0118 - Engine Temperature Sensor Short to Ground
 P1501 - Air Temperature Sensor Short to Ground

The following image shows the status text that will be displayed after the Clear Faults button has been pushed while the faults are being cleared in the ECU.

XV Tuner Beta Connected To ECU

Bike Info

General Info

Chassis Serial	ZD4VPC4037S000042	TPS Min	46
ECU Serial	247500018800	TPS Max	216
Current Map	Alice Racing SXV 5.5 Non-Solenoid	Idle CO	0.0%
Engine Hours	4 Hours 43 Minutes	Fuel Offset	0.0%

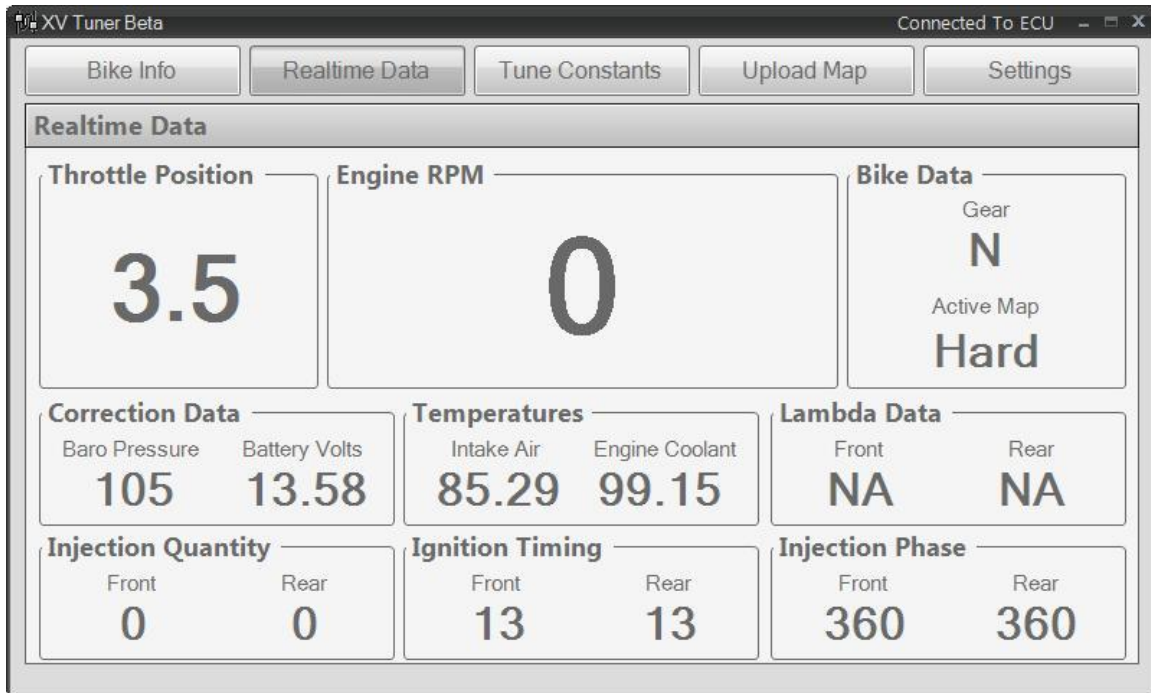
Fault Code Info

Clearing Fault Codes

Possible faults that may be displayed include:

- P0122 - Throttle Position Sensor Short to Ground
- P0123 - Throttle Position Sensor Open Circuit
- P0105 - Barometric Pressure Sensor Malfunction
- P0118 - Engine Temperature Sensor Short to Ground
- P0119 - Engine Temperature Sensor Open Circuit
- P0505 - Bypass Valve Malfunction
- P0562 - Battery Voltage Too Low
- P0563 - Battery Voltage Too High
- P1201 - Injector 1 Malfunction
- P1202 - Injector 2 Malfunction
- P1351 - Ignition Coil 1 Malfunction
- P1352 - Ignition Coil 2 Malfunction
- P1231 - Fuel Pump Short to Ground / Open Circuit
- P1232 - Fuel Pump Short to 12v
- P1501 - Air Temperature Sensor Short to Ground
- P1502 - Air Temperature Sensor Open Circuit
- P1552 - Cooling Fan Short to Ground / Open Circuit
- P1553 - Cooling Fan Short to 12v
- P1601 - ECR Relay Short to Ground / Open Circuit

Realtime Data Screen...



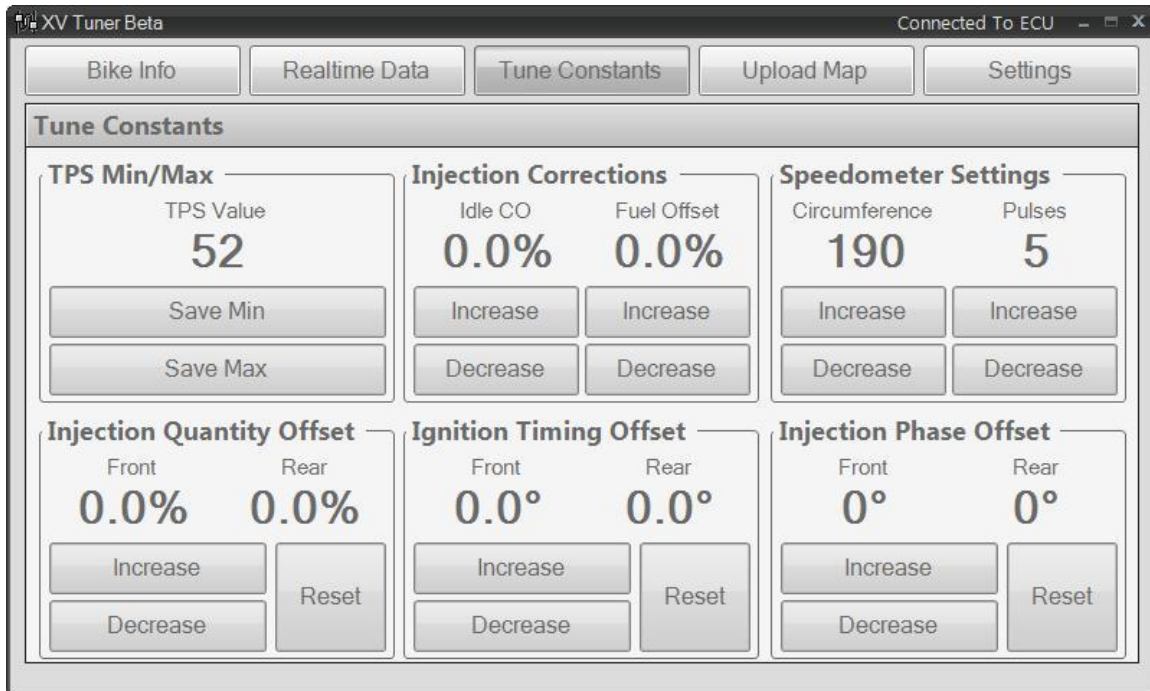
The Realtime Data screen displays current sensor data values and calculated engine management values that the ECU is using based upon the sensor inputs. All values are non-editable. The values displayed include:

1. **Throttle Position:** the current throttle position presented in percent based upon a 0-100% range between TPS minimum and TPS maximum. If the TPS minimum value is not set correctly, the throttle position display will continue to display 0.0 even if the throttle position sensor input continues to drop below the TPS minimum value. If the TPS maximum value is not set correctly, the throttle position display will indicate above 100%. If at any time it is noticed that the throttle position value seems to reach 0.0 before expected or the value exceeds 100% the TPS settings should be checked and set correctly using the Setting TPS Values tutorial.
2. **Engine RPM:** a display of the current engine RPM value read from the ECU.

3. Bike Data Gear: a display of the gear position detected by the ECU from the gear position sensor. A sensor input value not within the range of a gear position will result in an “E” displayed within this field, but will not generate a fault code.
4. Bike Data Active Map: a display of the current map being used by the ECU. Possible displayed values are “Hard”, “Soft” or “Start”.
5. Correction Data - Baro Pressure: a display of the current barometric pressure being used by the ECU. With some maps, the barometric pressure sensor is not read unless the engine is running and the ECU uses a value of 105 until running. Value is displayed in mbar.
6. Correction Data - Battery Volts: a display of the measured battery voltage that the ECU is currently using for various map corrections.
7. Temperatures - Intake Air: a display of the current intake air temperature as being read by the ECU from the airbox air temperature sensor. Value displayed in degrees Celsius.
8. Temperatures- Engine Coolant: a display of the current engine coolant temperature as being read by the ECU from the engine temperature sensor. Value displayed in degrees Celsius.
9. Lambda Data - Front and Rear: a display of the current lambda sensor values being sent to the ECU. These values require special firmware and hardware to be used. Most users should ignore any data presented as NA will be the only info displayed.
10. Injection Quantity - Front and Rear: a display of the fuel injector “ON” time that the ECU has calculated based upon the current operating conditions. Value is displayed in microseconds.

11. Ignition Timing - Front and Rear: a display of the ignition advance BTDC that the ECU has calculated based upon the current operating conditions. Value is displayed in degrees.
12. Injection Phase - Front and Rear: a display of the fuel injection pulse angle BTDC that the ECU has calculated based upon the current operating conditions. Value is displayed in degrees.

Tune Constants Screen...



The Tune Constants screen provides access to tuning parameters and sensor calibration. Modifications are made with increase and decrease buttons that will alter the values within the ECU in real-time with each press of a button. Displayed values are scaled to read in units as used by the ECU. Some parameters are limited to a usable value by the ECU and the buttons will not allow further modification beyond that point. The values that may be modified include:

1. **TPS Min/Max:** a display of the current value being read by the ECU of the throttle position sensor. This value may be monitored while rotating the throttle and should have a smooth integration from closed throttle to full throttle. This number will fall within the 0-255 range.
 - a) **Save Min button:** saves the currently read value of the throttle position sensor as the TPS Min value. If the current throttle position sensor value is higher than the previously set TPS Min value, a warning message will be displayed. More information is available about setting the TPS Min value in the Setting TPS Values tutorial.

- b) Save Max button: saves the currently read value of the throttle position sensor as the TPS Max value. If the current throttle position sensor value is less than the previously set TPS Max value, a warning message will be displayed. More information is available about setting the TPS Max value in the Setting TPS Values tutorial.
- 2. Injection Corrections - Idle CO: a display of the current value being used by the ECU for idle CO fuel correction. On most maps, idle CO fuel correction is only used when the engine RPM falls within the range of 500-3000 RPM. Increasing this value will add more fuel to the loaded map only within the idle range, decreasing will remove fuel. Value is displayed in percent.
 - a) Idle CO Increase and Decrease buttons: increments or decrements the current idle CO value by one step per press. Each step has a value of 0.8% and the parameter may only be adjusted from -9.4% to 9.4% with 0.0% being a neutral value.
- 3. Injection Corrections - Fuel Offset: a display of the current value being used by the ECU for fuel offset across the entire fuel table. Increasing this value will add more fuel to the entire loaded map, decreasing will remove fuel. Value is displayed in percent.
 - a) Fuel Offset Increase and Decrease buttons: increments or decrements the current fuel offset value by one step per press. Each step has a value of 0.8% and the parameter may only be adjusted from -5.5% to 5.5% with 0.0% being a neutral value.
- 4. Speedometer Settings - Circumference: a display of the current tire contact area circumference value being used as the distance traveled per revolution by the ECU during speed calculations. Value is displayed in centimeters.
 - a) Circumference Increase and Decrease buttons: increments or decrements the current circumference value by one step per press. Each step has a value of 1 centimeter.

5. Speedometer Settings - Pulses: a display of the current value being used by the ECU for the number of pulses per revolution of the wheel. This value is used in conjunction with circumference to calculate the speed signal to be sent to the display by the ECU.
 - a) Pulses Increase and Decrease buttons: increments or decrements the current pulses value by one step per press. Each step has a value of 1.
6. Injection Quantity Offset - Front and Rear: a display of the offset being applied to the fuel tables. Value is displayed in percent. This parameter is used for realtime table modifications without having to load a modified map to the ECU for testing purposes. With the current firmware, any modifications of these values are temporary and will be reset to 0.0% the next time the ECU power is cycled. The displayed value will only be updated with ECU values during a restart of the XV Tuner software or a change in value being sent to the ECU with the Increase or Decrease button.
 - a) Injection Quantity Offset Increase and Decrease buttons: increments or decrements the current injection quantity offset value by one step per press for both front and rear. Each step has a value of 0.8% and the parameter may only be adjusted from -9.4% to 9.4% with 0.0% being a neutral value.
 - b) Injection Quantity Offset Reset button: sets the current injection quantity offset value in the ECU to 0.0%.

7. Ignition Timing Offset - Front and Rear: a display of the offset being applied to the ignition tables. Value is displayed in degrees. This parameter is used for realtime table modifications without having to load a modified map to the ECU for testing purposes. With the current firmware, any modifications of these values are temporary and will be reset to 0.0 degrees the next time the ECU power is cycled. The displayed value will only be updated with ECU values during a restart of the XV Tuner software or a change in value being sent to the ECU with the Increase or Decrease button.

a) Ignition Timing Offset Increase and Decrease buttons: increments or decrements the current ignition timing offset value by one step per press for both front and rear. Each step has a value of 0.25 degrees and the parameter may only be adjusted from -10 to 10 degrees with 0.0 being a neutral value

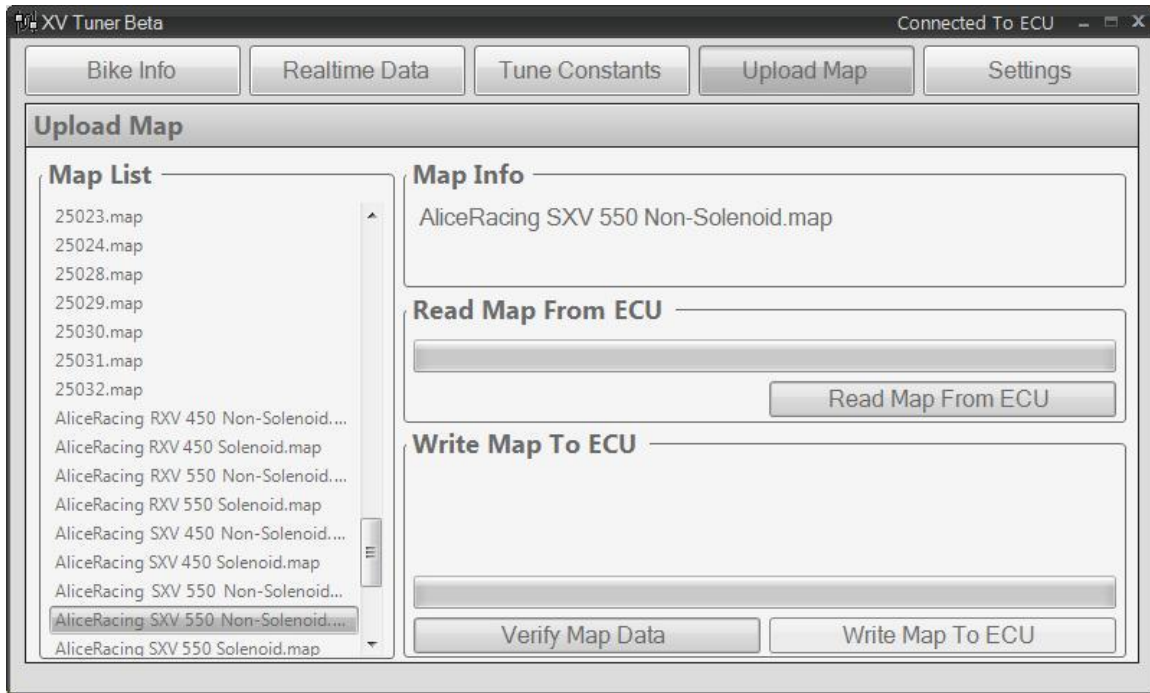
b) Ignition Timing Offset Reset button: sets the current ignition timing offset value in the ECU to 0.0 degrees.

8. Injection Phase Offset - Front and Rear: a display of the offset being applied to the injection phase tables. Value is displayed in degrees. This parameter is used for realtime table modifications without having to load a modified map to the ECU for testing purposes. With the current firmware, any modifications of these values are temporary and will be reset to 0.0 degrees the next time the ECU power is cycled. The displayed value will only be updated with ECU values during a restart of the XV Tuner software or a change in value being sent to the ECU with the Increase or Decrease button.

a) Injection Phase Offset Increase and Decrease buttons: increments or decrements the current injection phase offset value by one step per press for both front and rear. Each step has a value of 1 degree and the parameter may only be adjusted from -100 to 100 degrees with 0 degrees being a neutral value.

b) Injection Phase Offset Reset button: sets the current injection phase offset value in the ECU to 0 degrees.

Upload Map Screen...

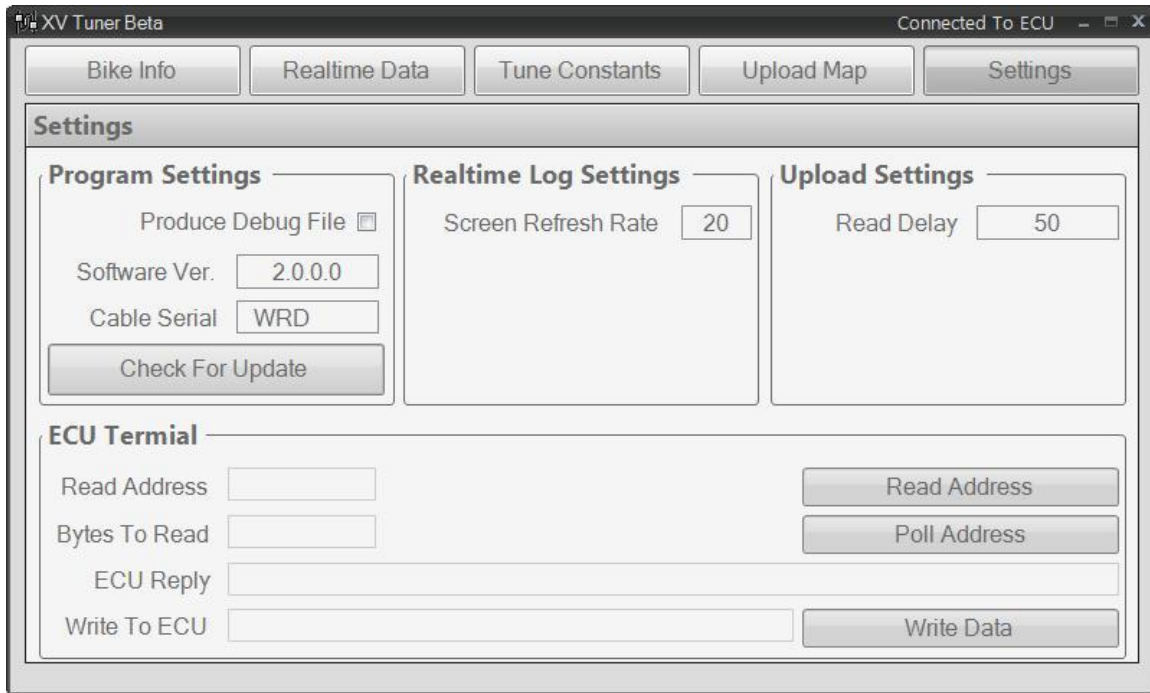


The Upload Map screen contains the controls needed to read and write maps to the ECU. A brief overview of each of the sections of this screen is listed below, while more detailed information for each section can be found in the tutorial section of this manual pertaining to the reading and writing of map files. The sections of this screen include:

1. **Map List:** a list of the map files currently found in the XV Tuner > maps folder on the computer. The maps will only be displayed if the interface cable is connected to the computer. Maps may be in .map or .bin format. The .map files have built in error checking, so they are the safest map to load to the ECU. The .bin files are raw binary files without error checking. Be cautious when transferring / sharing .bin files; a single bit being incorrect can cause the ECU to not function properly.

2. Map Info: displays available information about the map currently selected in the map list. Information is typically limited to the full file name of the map for custom maps or motorcycle model and map number for Aprilia factory maps, however a future software release will display the application information for Aprilia factory maps.
3. Read Map From ECU: displays the current status bar for the process of reading a map from the ECU and any status messages, if a map is currently being read.
 - a) Read Map From ECU button: initiates the process of reading the current map file from the connected ECU. A file name for the new file will be requested after the button has been pressed. The map read from the ECU will be saved in the XV Tuner > maps folder on the computer. More information is available in the tutorial section of this manual.
4. Write Map To ECU: displays the current status bar for the process of writing a map to the ECU and any status messages, if a map is currently being written or has been written to the ECU.
 - a) Verify Map Data button: executes the verification of the selected map file in the map list to ensure an error free file is being used for the write to ECU command. A map can not be written to the ECU without first being verified. More information is available in the tutorial section of this manual.
 - b) Write Map To ECU button: begins the process of writing a map to the ECU if the selected file has been verified. Instructions are displayed for the required key manipulations. More information is available in the tutorial section of this manual.

Settings Screen...



The Settings screen contains information and settings pertaining to the performance of the software and the diagnostics of communications problems. A terminal interface is present for use by advanced users to interrogate the ECU memory. An overview of each of the screen sections is as follows:

1. Program Settings: comprised of the following items:
 - a) Produce Debug File checkbox: in the event of problems using the software, Western Racing Developments may request that you create a debug file that can be sent and reviewed to attempt to identify the cause of the problem. Checking the checkbox enables the software to create a file on the computer that logs the software events as they occur. Un-checking the checkbox disables the software from creating the debug file. The created debug file can be found in the documents directory XV Tuner folder with the name "DeBug.txt"

- b) Software Ver: displays the version number of the XV Tuner program currently running.
- c) Cable Serial: displays the serial number of the detected interface cable.
- d) Check For Update button: initiates a search to determine if a newer version of the software is available. This feature is for future use and will not currently return anything other than an “Unable To Connect To Update Service” message.

2. Realtime Log Settings: comprised of the following items:

- a) Screen Refresh Rate value: sets the update rate for the realtime data log file that is created while using the software. The data log file will require the use of third party software to review the data, such as the GEMS Data Analysis package. The file can be found in the documents directory XV Tuner folder with the name format:

“XV Tuner Log (month).(day).(year) (hour).(minute).(second) (AM/PM).stf”

3. Upload Settings: comprised of the following items:

- a) Read Delay: displays the delay between writes and reads with the ECU during a map writing process. Value is in milliseconds. Slower computers and .bin file operations will require longer delay values to prevent a download failure.

4. ECU Terminal: The contents of the ECU Terminal section are for advanced users only and will not be discussed in this manual. Advanced users will be provided separate instructions for using the terminal features.

Reading A Map From ECU Tutorial...

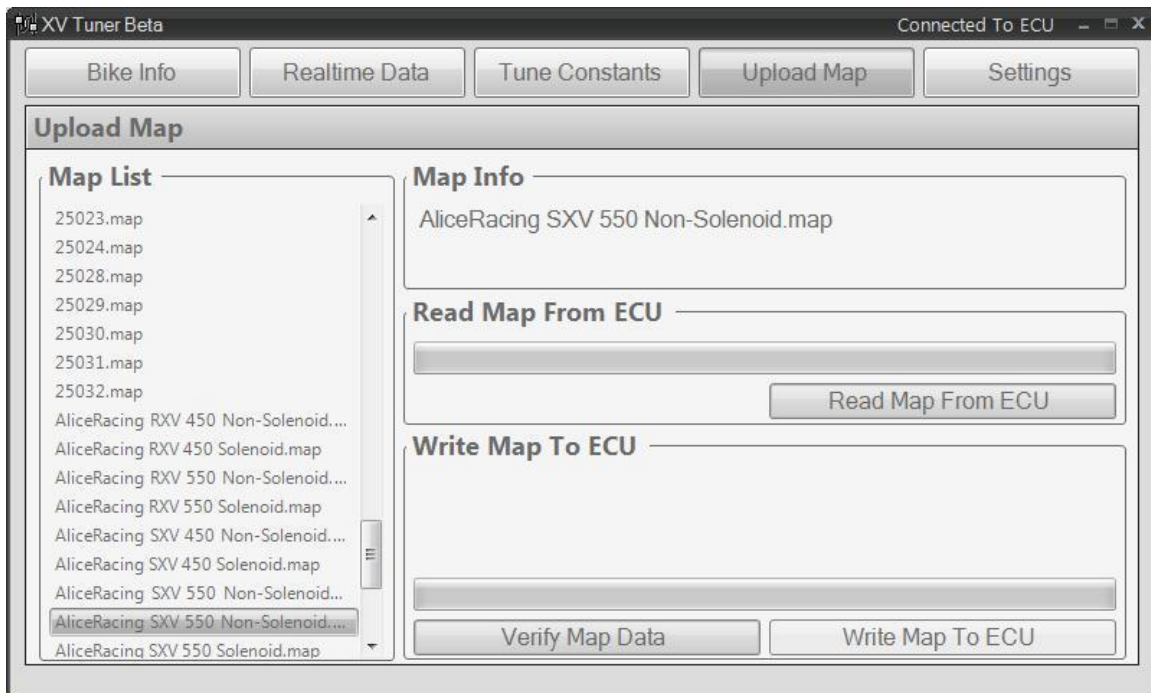
Reading a map from the ECU creates a binary (.bin) file on the computer in the Documents > XV Tuner > Maps folder. This binary file may be written back to the ECU at a later time or edited with a third party software package prior to writing to the ECU. Reading the map from an ECU prior to writing a map to the ECU is recommended if the history of the ECU is unknown. Although the reported “current map” on the Bike Info screen may indicate a common map file, there is no means to verify that the map loaded in the ECU is not a “Custom” map that will be permanently lost when the ECU memory is cleared for the new map.

It is important to note that when a map is read from the ECU the “Tune Constants” values are not contained within the new binary file. Tune constants are stored within the ECU in a separate memory area and will not be stored in the binary file. The tune constant values should be manually recorded in a text file or screen capture image file if they are to be retained with the binary file for future use.

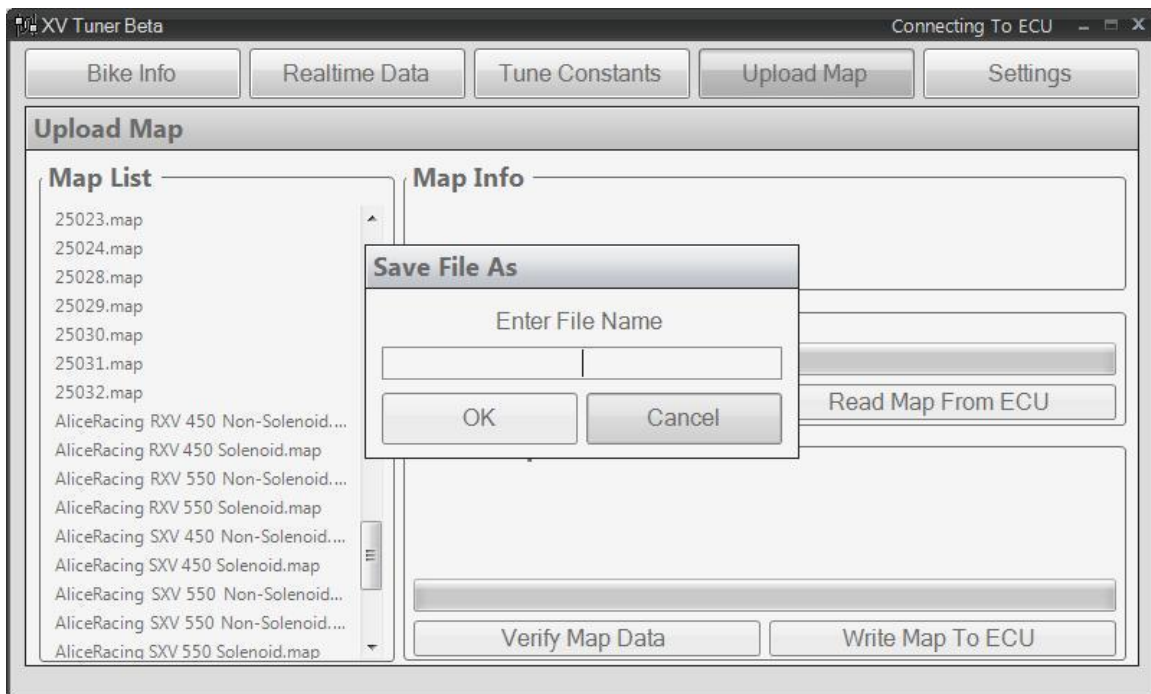
The process of reading the map from the ECU requires the interface cable to be connected to the ECU with the key switch “ON”. It is recommended that a battery charger, such as a tender, be connected during any read or write operation with the ECU to ensure that the ECU power is not lost before completion.

Follow these steps to read the map file from the ECU and create the new binary file on the computer:

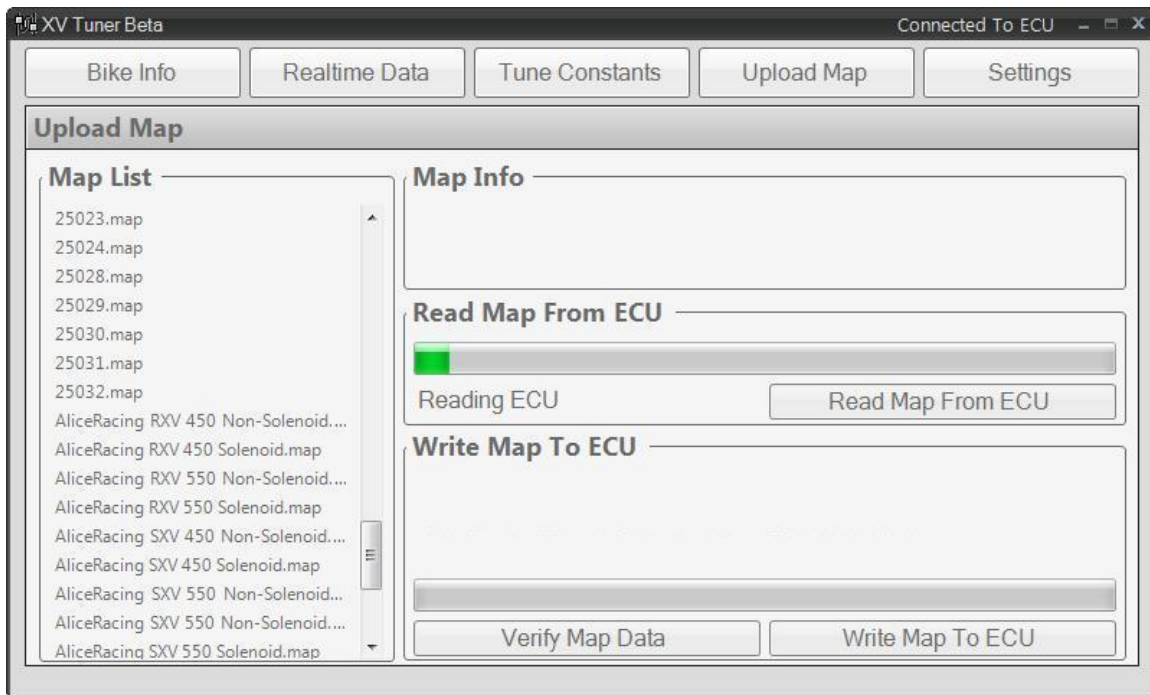
1. With the XV Tuner software running and the interface cable connected to the powered ECU, select the Upload Map screen.



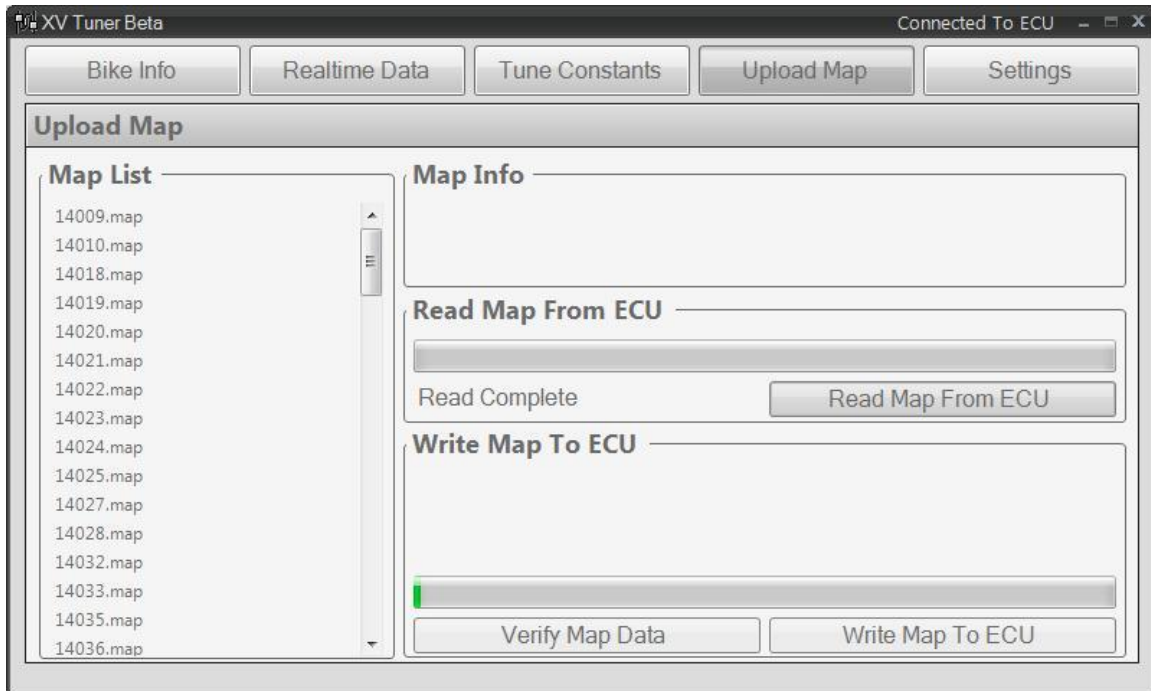
2. Click on the “Read Map From ECU” button. A dialog box will appear asking for the file name to be assigned to the new binary file. Enter the desired name for the file, but take caution not to duplicate an existing file name. Click the cancel button to end the process if the operation was executed by mistake.



3. Once a suitable name for the file has been entered, click on the OK button to begin reading the map from the ECU. The reading process will take a few minutes to complete. A progress bar will update as the operation progresses and a status message of “Reading ECU” should be present.



4. When the read process from the ECU has completed a status message of “Read Complete” should be present. The Map List will update and the new binary file will appear in the Map List.



As mentioned earlier, the new binary file can now be written to the ECU at a later date, if desired, or modified with a third party editing software package.

Due to the complexities of editing the binary files, it is not recommended that editing be attempted without a thorough understanding of the procedure and the software being used to edit the file. Serious damage may result if the edited binary file contains errors. Any editing of the binary file is done “At Your Own Risk”!

Writing A Map To ECU Tutorial...

Writing a map to the ECU replaces the existing map loaded in the ECU. There is no option to “undo” and recover the previously loaded map in the ECU. Reading the map from an ECU prior to writing a map to the ECU is recommended if the history of the ECU is unknown. Although the reported “current map” on the Bike Info screen may indicate a common map file, there is no means to verify that the map loaded in the ECU is not a “Custom” map that will be permanently lost when the ECU memory is cleared for the new map.

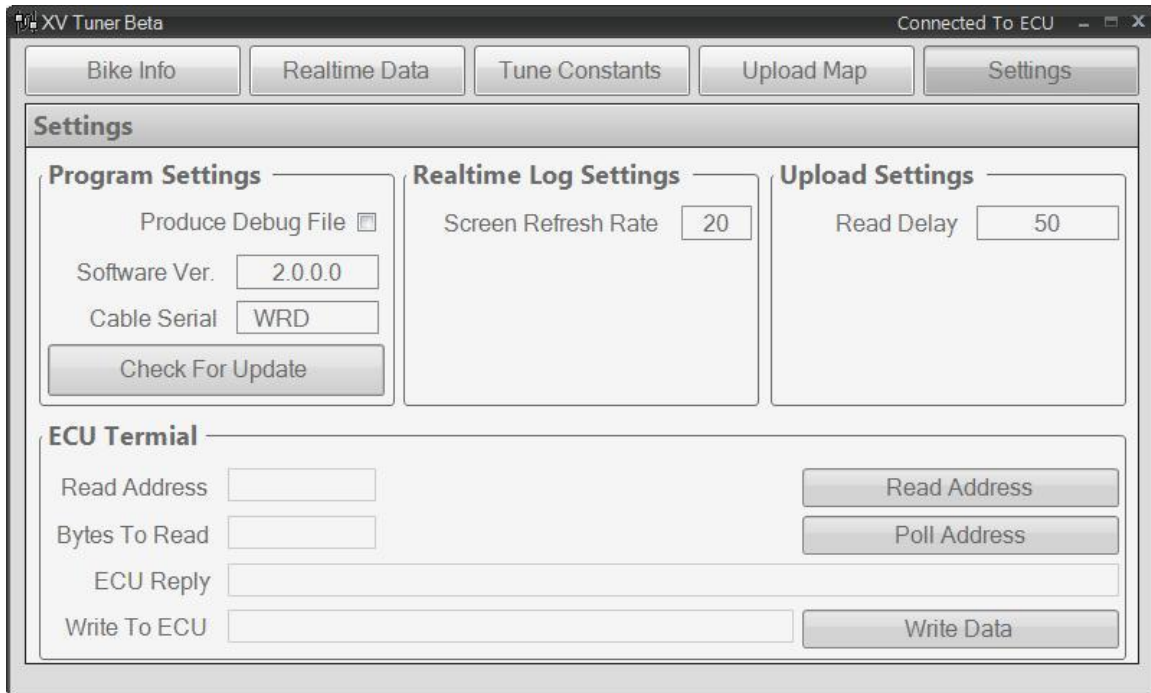
It is important to note that when a map is written to the ECU the “Tune Constants” values are not modified. Tune constants are stored within the ECU in a separate memory area that will retain the existing values. The tune constant values should be reviewed for adequacy prior to attempting to start the engine after a map is written. The previously loaded map may have required abnormally low or high fuel offset values that may not be suitable for use with the new map. Return any tune constant offset values to a neutral value prior to starting the engine if appropriate values are not known.

The process of writing a map to the ECU requires the interface cable to be connected to the ECU and the ignition switch “ON” for an extended period. It is recommended that a battery charger, such as a tender, be connected during the write operation with the ECU to ensure that the ECU power is not lost before completion.

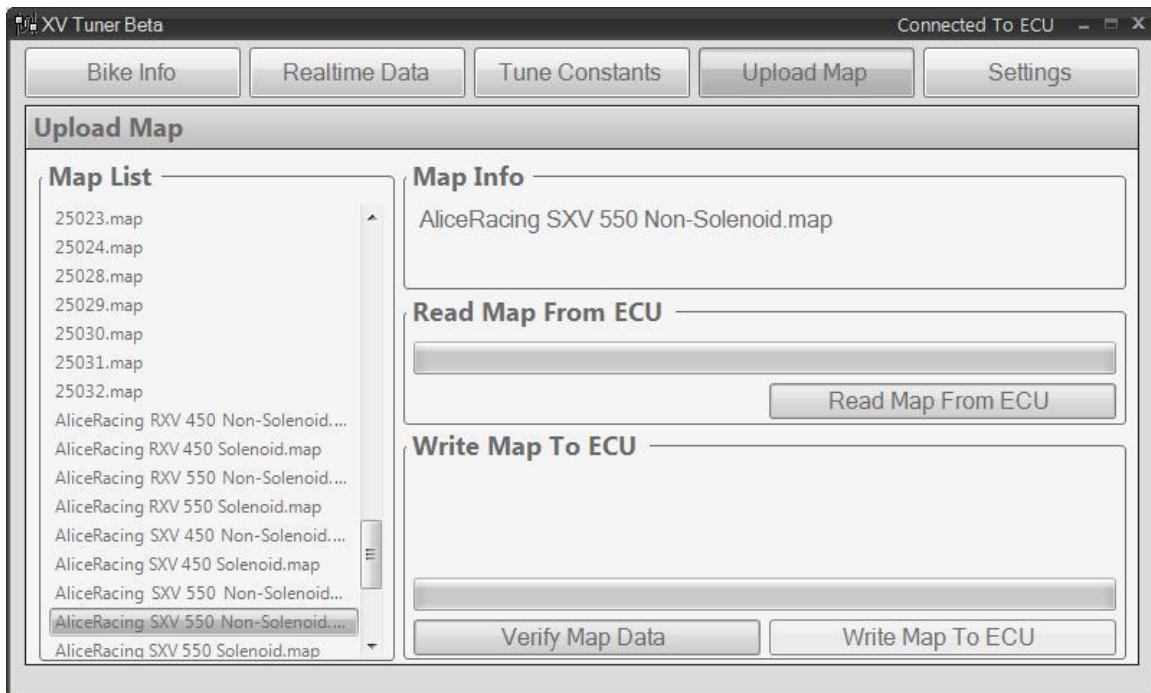
Communication with the ECU is critical during the writing process. A failed download will occur if any communication issues are detected. The “Read Delay” value on the Settings screen controls the communication flow between the software and the ECU. Faster computers can take advantage of lower delay values, while computers with the minimum system requirements may need to increase the delay value to complete the process successfully. Writing binary will require a higher delay value than a factory map due to the process that is used for writing the file to the ECU. To minimize the possibility of having a failure, a higher delay value may be used for all writing operations. If a failure occurs during the writing process, DO NOT turn the ignition switch “OFF”. Proceed to the “Failure During Writing File” section to continue.

Follow these steps to write a map file to the ECU:

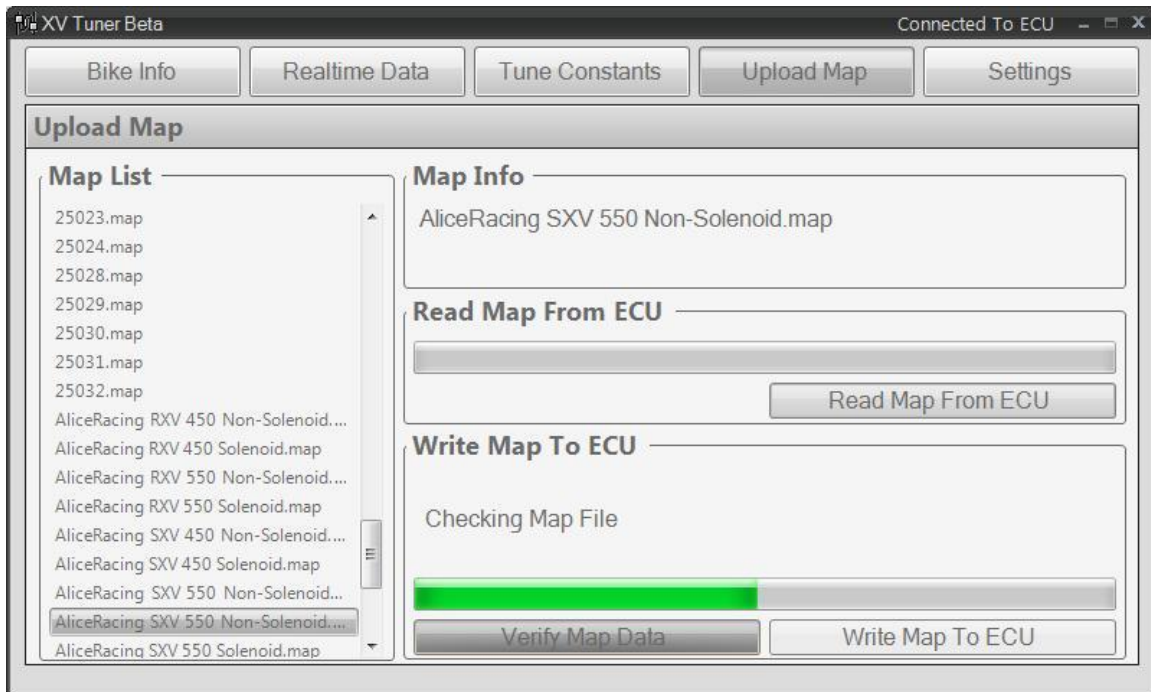
1. Verify an adequate “Read Delay” value is set on the Settings screen.



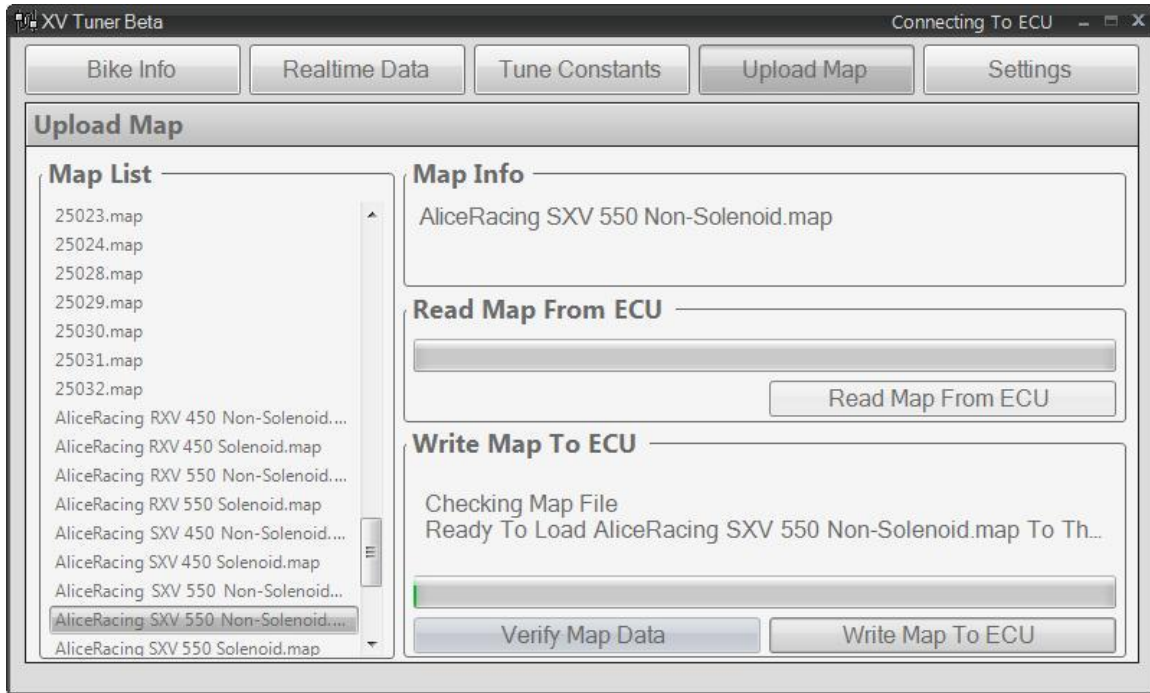
2. Highlight the map file to be written to the ECU in the Map File list on the Upload Map screen. Ensure that the Map Info section displays the map file that you want to write to the ECU.



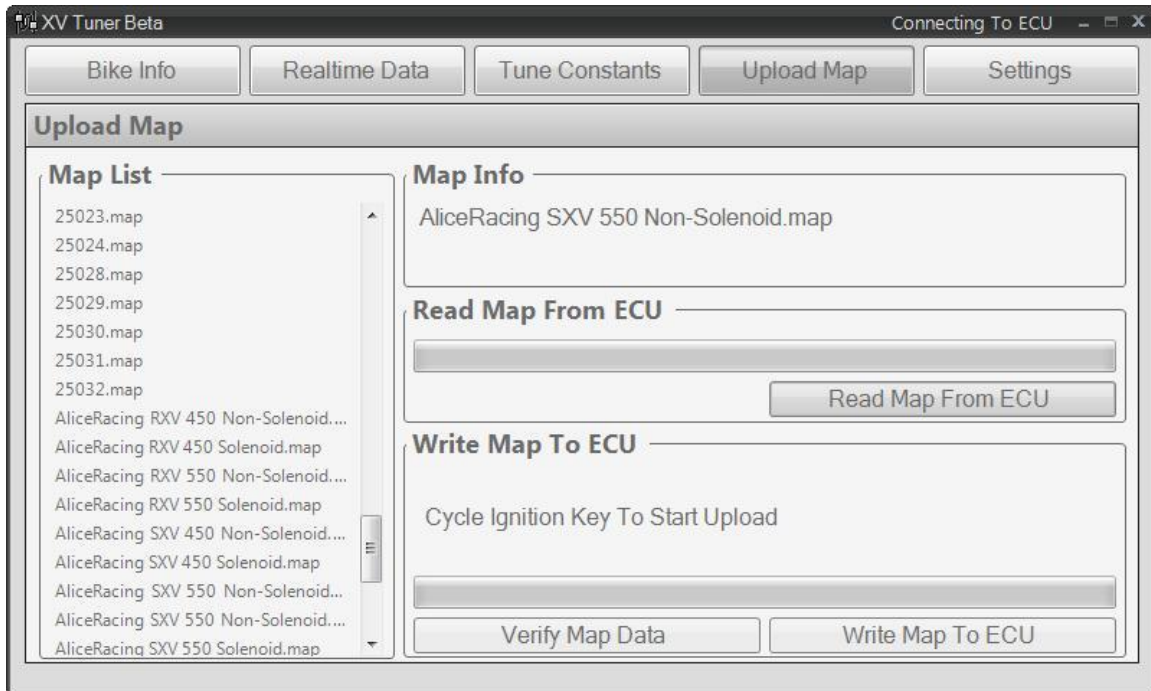
3. Verify the map file is not corrupt by pressing the “Verify Map Data” button. XV Tuner will examine the map file and a progress bar will update as the operation progresses and a status message of “Checking Map File” should be present.



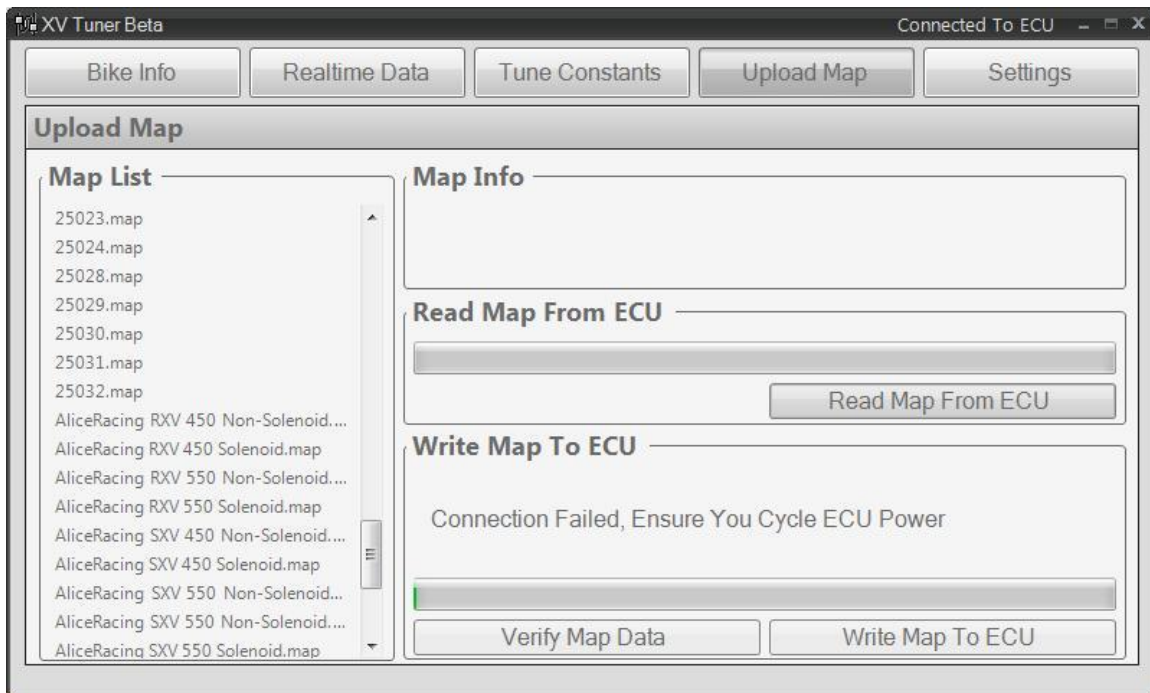
4. When the map file has been verified the status message will be updated to inform that the map file is ready to be written to the ECU. If any errors were found in the map file, the status message will indicate that there were errors and the operation will be cancelled.



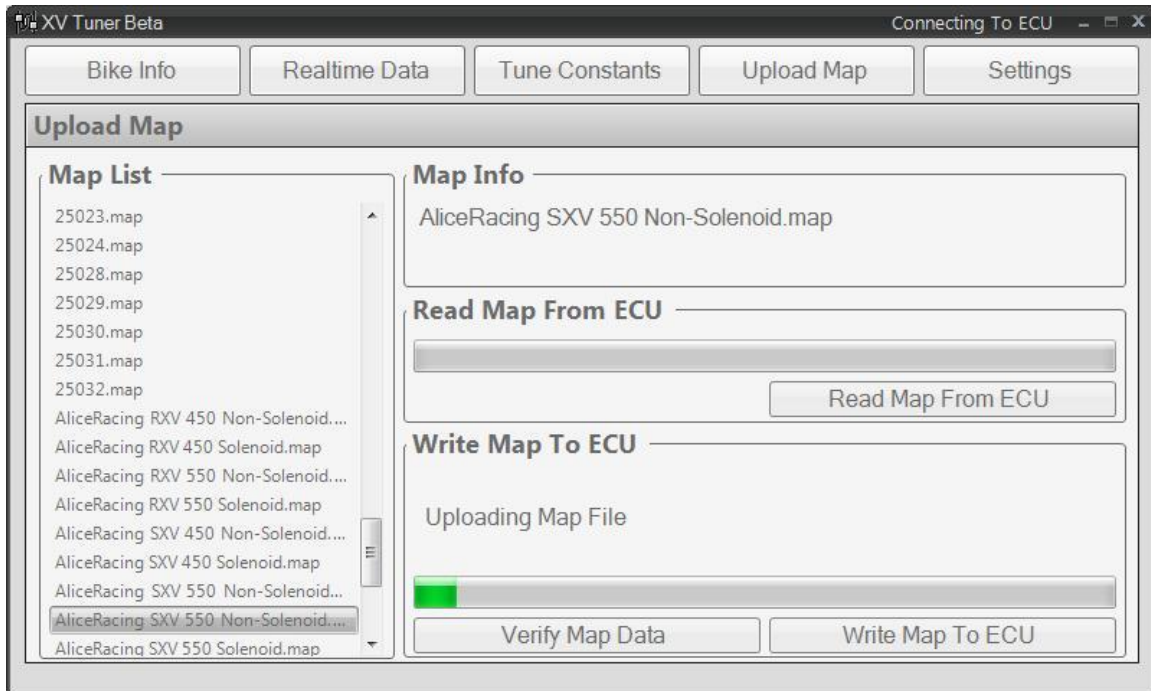
5. Click the “Write Map To ECU” button to begin the transfer of the map file to the ECU. The status message will update and instruct you to “Cycle Ignition Key To Start Upload”. Turn the ignition switch to the “OFF” position for three to five seconds to ensure the ECU has had enough time to reset before turning it back to the “ON” position.



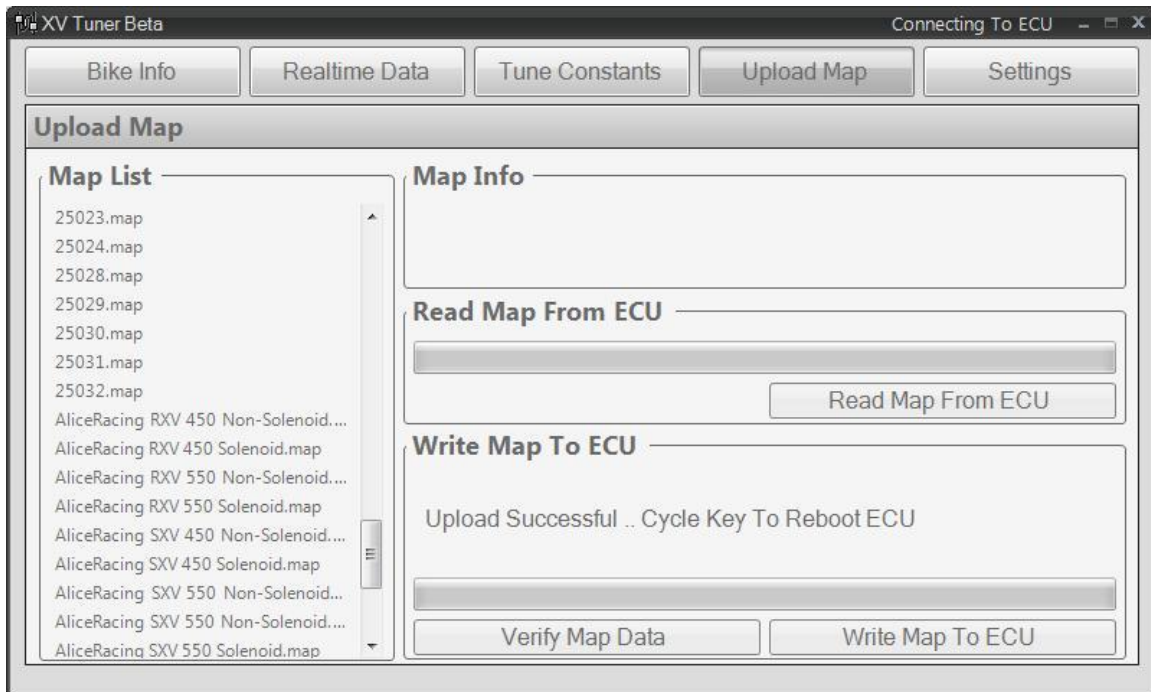
6. You will have approximately thirty seconds to cycle the ignition switch from “OFF” to “ON” before XV Tuner will cancel the operation and display the message “Connection Failed, Ensure You Cycle ECU Power”. A common cause for XV Tuner to not detect the cycling of the ignition switch is the ground wire on the interface cable not being connected correctly.



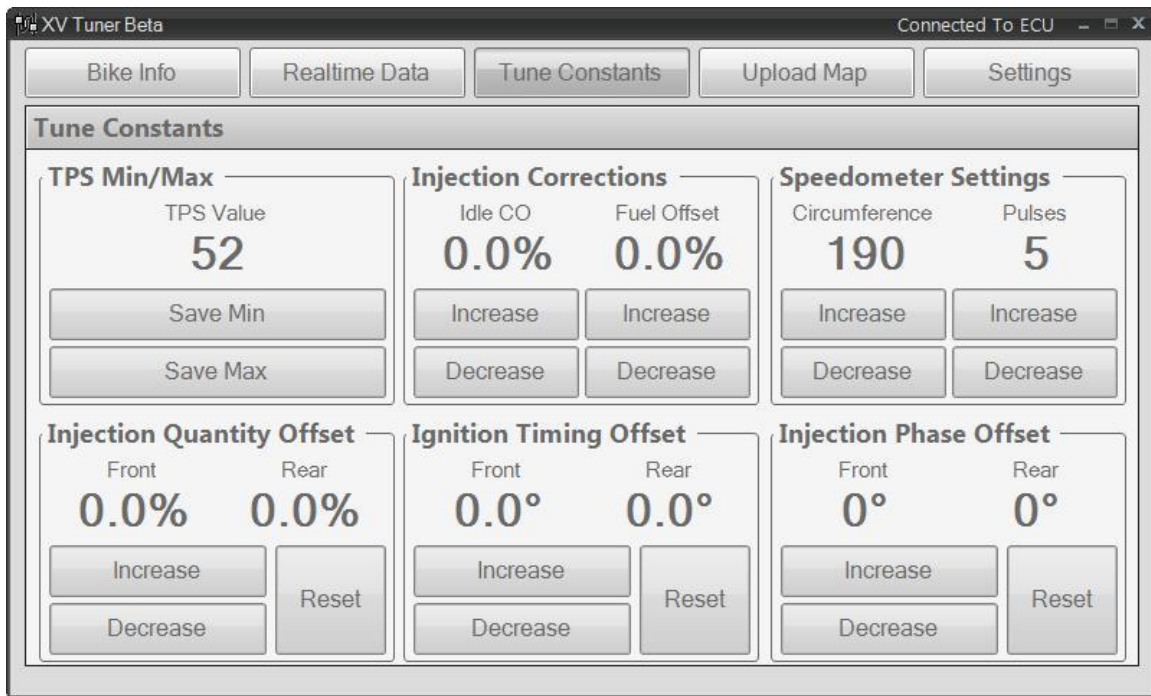
7. When XV Tuner detects the ECU communicating after the cycling of the ignition switch, the ECU flash memory will be cleared and the map file will begin transferring. A progress bar will update as the operation progresses and a status message of “Uploading Map File” should be present. The process may take several minutes to complete, depending upon computer speed and Read Delay setting. If the upload fails, DO NOT turn the ignition switch “OFF”, but proceed to the “Failure During Writing File” section to continue.



8. When the file transfer is complete, the status message will update to indicate “Upload Successful... Cycle Key To Reboot ECU”. Cycle the ignition switch as instructed. Verify XV Tuner is once again connected to the ECU.



9. Open the Tune Constants screen and modify any values that may need to be changed for use with the newly loaded map.



Once the tune constants have been set as needed, the new map is ready for use and the engine can be started.

Failure During Writing File Tutorial...

Several factors may lead to a failure during the writing of a file to the ECU. Among them are low battery voltage to the ECU, poor communications with the ECU due to computer issues and inadequate settings within XV Tuner for the task at hand. All of the possible causes lead to the same problem: there is not a complete file loaded in the ECU! You were instructed earlier to NOT cycle the ignition switch if a failure occurred. There is a very good reason for that advice.

When the ECU does not contain a complete file upon power up, it may have unpredictable behavior. The ECU may have no operation and XV Tuner may no longer be connected. Another possibility that has occurred is it turns “ON” all outputs as a default state. That means that the ignition coils will be constantly charging, the fuel injectors will be opened to one hundred percent duty cycle, the cooling fan will be running, the headlight will be on, the ECR relay will be energized and the fuel pump will be running. Having the fuel injectors on full and a fuel pump running will fill the engine with fuel. An observed side effect of this type of ECU behavior is that the ignition switch is NOT able to turn the ECU off. The only option to turn everything off is to remove power at the battery. Not all failures have such abnormal behavior, but if the ignition switch is not cycled after a failure it will not occur. Be aware that these extremes are possible, and know how to recognize them if they occur. The sooner the battery is disconnected, the better.

To safely recover from a failure, use the following procedure:

1. Leave the ignition switch in the “ON” position, even though XV Tuner indicates that it is not connected to the ECU.
2. Close XV Tuner and restart.
3. Open the Settings screen and increase the Read Delay value.
4. Open the Upload Map screen and select the desired map file from the Map List.
5. Click the “Verify Map Data” button.
6. Once map is verified, click the “Write Map To ECU” button.
7. Cycle the ignition switch only AFTER the status message instructs you to “Cycle Ignition Key To Start Upload”.
8. Follow the instructions from this point as a normal map transfer.

Setting the TPS Values Tutorial...

Throttle position information is a critical part of engine management. The throttle position sensor (TPS) provides the ECU with the engine intake air volume feedback that is used in conjunction with engine RPM feedback to determine the amount of fuel that is to be injected. If the TPS Min and TPS Max values are not set correctly within the ECU, the ECU will inject an incorrect amount of fuel into the engine for the current throttle position and engine RPM. The end result is poor engine performance, and in many cases, poor engine starting.

Setting the TPS values correctly requires the throttle bodies to be positioned to both fully closed and fully opened during the process. The throttle position sensor values from each extreme are loaded into the TPS Min and TPS Max parameters. Since these values are relative to the physical position of the throttle bodies and are tune constant values, it is not necessary to set the TPS Min and TPS Max values each time a map is written to the ECU, but must be checked if any changes have been made to the throttle body assemblies. TPS Min and TPS Max values should be checked periodically for accuracy.


The TPS Min value **MUST** be set with the throttle bodies **FULLY** closed. Once the throttle body assemblies have been set up correctly, it should only require decreasing the idle adjustment to achieve a fully closed state. Several adjustments may prevent the throttle bodies from closing fully and must be addressed prior to setting the TPS Min value. Some of the possible causes are the individual throttle stop screws located on each throttle body, throttle cable adjustment and in some case the throttle linkage itself as a result of the throttle synchronizing process.

The process of setting the TPS Min and TPS Max values requires the interface cable to be connected to the ECU and the ignition switch “ON” for an extended period. It is recommended that a battery charger, such as a tender, be connected during the procedure to ensure that the ECU power is not lost before completion.

TPS Min and TPS Max values may be set individually or in either order. The important part is that each value is set correctly. This tutorial

will start with the TPS Min value due to the additional steps required for successful completion.

1. Open the Bike Info screen and make a note of the current TPS Min and TPS Max values. These are the current values in use by the ECU. The currently set values will be compared to the TPS Value in future steps.



The screenshot shows the 'XV Tuner Beta' software window, which is 'Connected To ECU'. The 'Bike Info' tab is selected, displaying two sections: 'General Info' and 'Fault Code Info'.

General Info

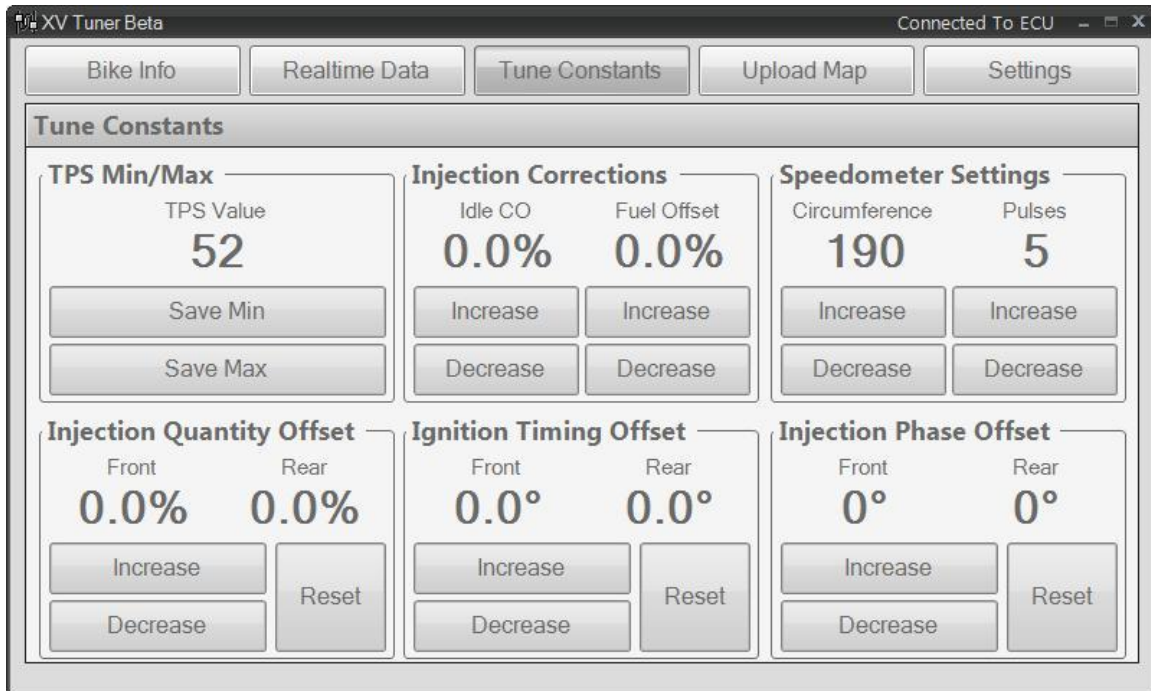
Chassis Serial	ZD4VPC4037S000042	TPS Min	46
ECU Serial	247500018800	TPS Max	216
Current Map	Alice Racing SXV 5.5 Non-Solenoid	Idle CO	0.0%
Engine Hours	4 Hours 43 Minutes	Fuel Offset	0.0%

Fault Code Info

No Faults Found

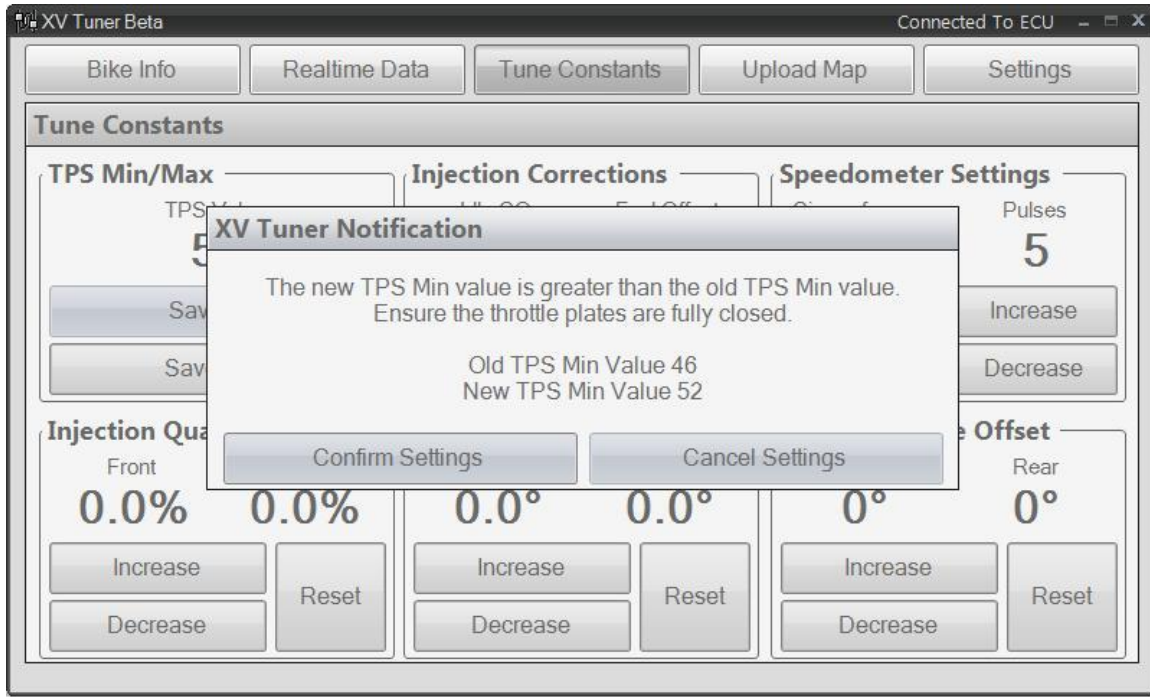
Clear Faults

2. Open the Tune Constants screen and make a note of the TPS value. This is the current sensor input value that corresponds to the idle screw adjustment currently needed for proper idle speed. This value will be used in a future step to reset the idle adjustment.

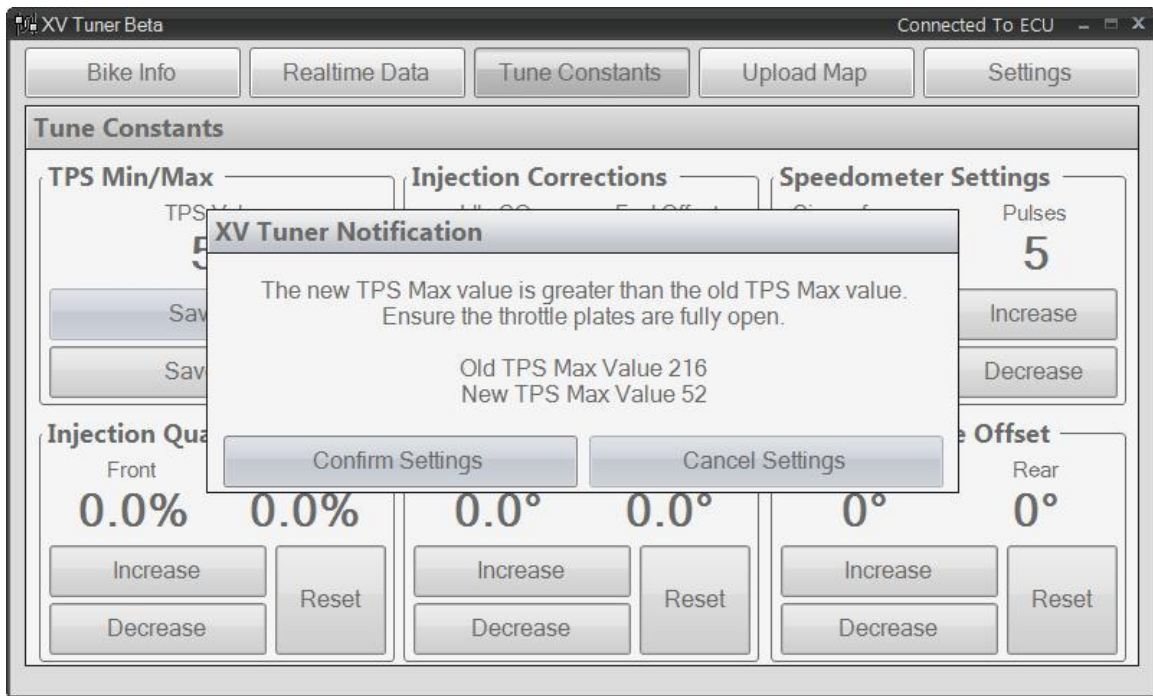


3. While monitoring the TPS Value on the Tune Constants screen, decrease the idle adjustment by turning the idle adjustment knob counterclockwise. The TPS Value should decrease as the idle adjustment knob is turned. Use the noted value from step 1 as an indication of progress. Continue to decrease the adjustment until the TPS Value no longer decreases. Turn the idle adjustment knob ONE turn further and stop. Do not continue to turn the idle adjustment further or it may become disconnected from the throttle assembly. The throttle bodies should now be fully closed with a TPS Value of approximately 42 – 48 being displayed. A TPS Value above the 42 – 48 range may indicate that there is another force preventing the throttle bodies from fully closing and must be identified and corrected before continuing. Monitor the TPS Value on the Tune Constants screen as adjustments are made to observe the impact.
4. When it is confirmed that the throttle bodies are fully closed, snap the throttle a couple of times to confirm a repeating value. Click the “Save Min” button to write the value to the ECU. If the new TPS Min value is greater than the previously set value a confirmation window will appear. Click the Cancel Settings button to leave the existing value or click the Confirm Settings

button to continue and overwrite the existing value with the new value. A lower or equal value will be accepted without a confirmation window.



5. While monitoring the TPS Value on the Tune Constants screen, increase the idle adjustment by turning the idle adjust knob clockwise until the TPS Value matches the previously noted value from step 2. This will return the idle adjustment to the correct setting for the next engine start.
6. Rotate the throttle to the WOT position and hold while monitoring the TPS Value on the Tune Constants screen. The TPS Value should increase to approximately 212 – 218. Click the “Save Max” button to write the value to the ECU. . If the new TPS Max value is less than the previously set value a confirmation window will appear. Click the Cancel Settings button to leave the existing value or click the Confirm Settings button to continue and overwrite the existing value with the new value. A greater or equal value will be accepted without a confirmation window. The current confirmation window contains a text error stating that the new TPS Max value is greater than the old TPS Max value rather than less. This should be corrected in a future release.



7. Release the throttle. The TPS Values are now set.

Map List

For reference, Aprilia factory maps use the following numbering convention to identify maps:

First digit identifies the model of motorcycle

1 denotes SXV

2 denotes RXV

Second digit identifies the displacement

4 denotes 4.5 (450)

5 denotes 5.5 (550)

Third thru fifth digits identify the map sequential number

Lower numbers denote older maps.

Example:

Aprilia factory map 15030 is map number 30 for the SXV 5.5

The following map files are provided with XV Tuner and should only be written to a motorcycle for which it was designed:

SXV 450

14009 mapping for Termignoni exhausts (6 seconds)

14010 mapping for **Silmoto** exhausts (6 seconds)

14018 latest update of the standard mapping

14019 latest update of the standard US mapping (NOTE)

14020 latest update of the standard Japan mapping

14021 latest update of the mapping for **Silmoto** exhausts

14022 Model Year 2007 Van Den Bosch mapping

14023 mapping for Akrapovic exhausts

14024 latest update of the standard Street Legal US mapping (NOTE)

14025 latest update of the Euro 3 MY 2008 standard mapping

14027 Model Year 2008 Van Den Bosch "double mapping"

14028 Full Power mapping MY 2008 "double mapping"

14032 Model Year 2008 USA Full Power mapping

14033 latest standard mapping update for the solenoid valve kit

14035 latest standard USA mapping update for the solenoid valve kit (NOTE)

14036 latest mapping update for Arrow exhausts for the solenoid valve kit

14037 latest mapping update for Silmoto exhausts for the solenoid valve kit

14038 latest mapping update for Akrapovic exhausts for the sol valve kit

Alice Racing SXV 450 Non-solenoid

Alice Racing SXV 450 Solenoid

RXV 450

24004 mapping for Termignoni exhausts
24005 mapping for Silmoto exhausts
24009 mapping for Termignoni exhausts (6 seconds)
24010 mapping for Silmoto exhausts (6 seconds)
24013 mapping for Akrapovic exhausts (6 seconds)
24020 latest update of the standard mapping
24021 latest update of the standard US mapping (NOTE)
24022 latest update of the standard Japan mapping
24023 latest update of the mapping for Akrapovic exhausts
24026 mapping for Arrow exhausts
24027 latest update of the standard Street Legal US mapping (NOTE)
24028 latest update of the Euro 3 MY 2008 standard mapping
24029 Model Year 2008 Merriman mapping
24032 Model Year 2008 USA Full Power mapping
24033 latest standard mapping update for the solenoid valve kit
24034 latest standard USA mapping update for the solenoid valve kit (NOTE)
24035 latest mapping update for Akrapovic exhausts for the sol valve kit
24036 latest mapping update for Arrow exhausts for the solenoid valve kit
Alice Racing RXV 450 Non-solenoid
Alice Racing RXV 450 Solenoid

SXV 550

15008 mapping for Termignoni exhausts (6 seconds)
15009 mapping for Silmoto exhausts (6 seconds)
15017 latest update of the standard mapping
15018 latest update of the standard US mapping (NOTE)
15019 latest update of the standard Japan mapping
15020 latest update of the mapping for Silmoto exhausts
15021 Model Year 2007 Van Den Bosch mapping
15022 mapping for Akrapovic exhausts
15023 latest update of the standard Street Legal US mapping (NOTE)
15024 latest update of the Euro 3 MY 2008 standard mapping
15026 Van Den Bosch Model Year 2008 map (dual map with throttle body offset linkage spindle on throttle body)
15027 Full Power mapping Model Year 2008 "double mapping"
15030 Model Year 2008 USA Full Power mapping
15031 latest standard mapping update for the solenoid valve kit
15032 latest standard USA mapping update for the solenoid valve kit (NOTE)
15033 latest mapping update for Arrow exhausts for the solenoid valve kit
15034 latest mapping update for Silmoto exhausts for the solenoid valve kit
15035 latest mapping update for Akrapovic exhausts for the sol valve kit
Alice Racing SXV 550 Non-solenoid
Alice Racing SXV 550 Solenoid

RXV 550

25007 mapping for Silmoto exhausts (6 seconds)
25010 mapping for Akrapovic exhausts (6 seconds)
25016 latest update of the standard mapping
25017 latest update of the standard US mapping (NOTE)
25018 latest update of the standard Japan mapping
25019 latest update of the mapping for Akrapovic exhausts
25022 mapping for Arrow exhausts
25023 latest update of the standard Street Legal US mapping (NOTE)
25024 latest update of the Euro 3 Model Year 2008 standard mapping
25028 Model Year 2008 USA Full Power mapping
25029 latest standard mapping update for the solenoid valve kit
25030 latest standard USA mapping update for the sol valve kit (NOTE)
25031 latest mapping update for Akrapovic exhausts for the sol valve kit
25032 latest mapping update for Arrow exhausts for the solenoid valve kit
Alice Racing RXV 550 Non-solenoid
Alice Racing RXV 550 Solenoid

NOTE: “Standard US”, “Street Legal US” and “Standard USA” maps are intended only for use in restricted engines.