BITZ RACING

LC-1 Wide Band Oxygen Sensor Installation guide for the CIS to EFI conversion kit

Installation Guide Rev 1.2

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Disclaimer

By installing the LC-1 wideband Oxygen sensor you agree to the following terms and conditions:

You agree to be fully responsible for any personal injury or property damaged caused directly or indirectly of this product. It is your responsibility for meeting any laws with regards to purchasing and installing such a product on your vehicle.

If you were not made aware of these conditions prior to purchasing the product, and do not agree with these conditions, you can return the product for a refund.

Playing Safe

Refer to the BITZ Racing CIS to EFI installation guide for safety guidelines.

Kit Contents

The LC-1 includes the wide band oxygen sensor, Wideband Oxygen controller, Weld on bung, serial interface cable, calibration switch, and LED. Unlike a narrow band oxygen sensor which only needs +12v to operate, a wide band oxygen sensor requires a special controller.

Refer to the Innovate Motorsport installation Guide

Install the software found on the CD that came with the package on your Laptop that will be used for tuning the MegaSquirt. Once installed open up the "LC-1 Manual" found in the CD and read it through. There is no hard copy of the LC-1 manual included.

This guide only deals with the wiring for the Bitz Racing EFI kit. You must follow the "LC-1 Manual" for proper calibration and mounting instruction of the Innovate Wide Band O2 sensor.

Wiring LC-1 for the BITZ Racing EFI kit

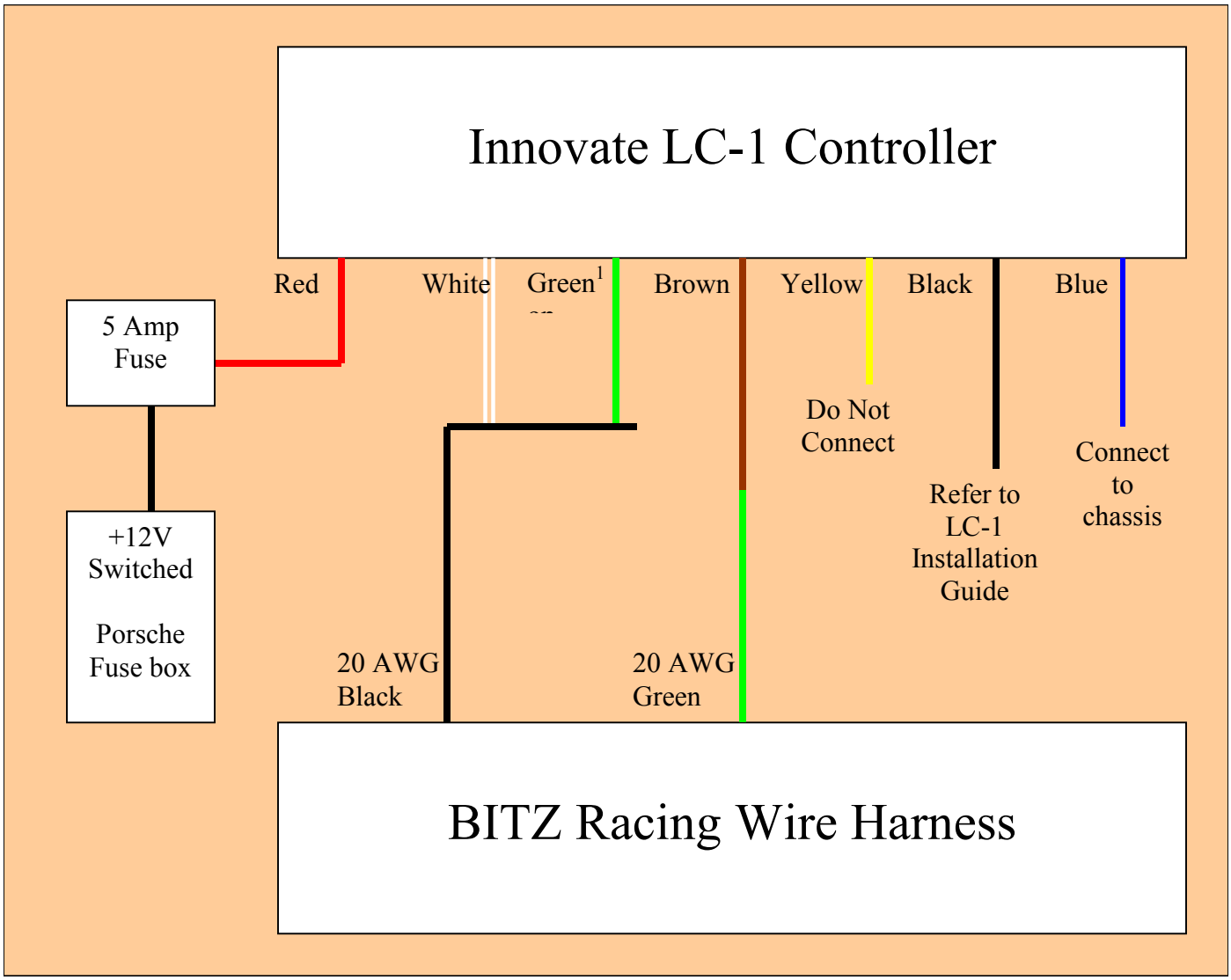


Figure 1 : LC-1 wiring diagram

Refer to Figure 1 for wiring the LC-1 controller to the BITZ Racing wire harness.

- The Red wire from the LC-1 Controller connects to the 5 Amp fuse supplied with the BITZ Racing kit. The other end of the 5 Amp fuse connects to the Porsche fuse box in the engine bay. Refer to the BITZ Racing installation guide for pictures of this location.

- The White wire from the LC-1 Controller is tied to the Green wire of the LC-1 controller. ([1]Note: in the later versions of the LC-1 there is no longer a green wire and it can be omitted in the wiring). These two wires connect to the unused TPS ground wire (pin #2 of DB-37 connector) on the BITZ Racing wire harness. This is the unused 20 AWG TPS ground wire in the EFI installation. You most likely have this black wire tied with the BITZ Racing Yellow wire (pin #22 on DB-37). Add the LC-1 white and Green wires to this connection.. If you ended up installing a TPS in your vehicle you can still connect the two LC-1 wires to this ground wire. These are analog grounds and should NOT be connected to the chassis of the vehicle. They should be grounded back at the MegaSquirt connector. (note: Do NOT connect this to the larger 16AWG black wire from the harness.)

- The Brown wire from the LC-1 Controller is tied to the Green wire from the BITZ Racing wire harness. This is the Wide Band output voltage that the MegaSquirt will read to determine Air Fuel Ratio.

- The Yellow wire from the LC-1 Controller is not connected. This wire emulates a narrow band O2 output to fool modern ECUs. This is not needed for the BITZ Racing EFI conversion.

- The Blue wire from the LC-1 Controller is the heater ground and can be connected on the chassis. Note that it draws a fair amount of current and should have a good clean ground connection.

- The black wire from the LC-1 Controller is used for calibrating the LC-1 controller. Refer to the Innovate LC-1 Manual for details on how to hook this up and how to operate it.

Note that the wires from the LC-1 Controller are very thin. If you will be using the "butt-crimps" that came with the kit, you should twist both wires together and install both wires being crimped on the same side of the butt-crimp. An example is shown below from the BITZ Racing EFI kit. (Note that the wire in the picture is not part of the LC-1 installation and is only shown as an example).

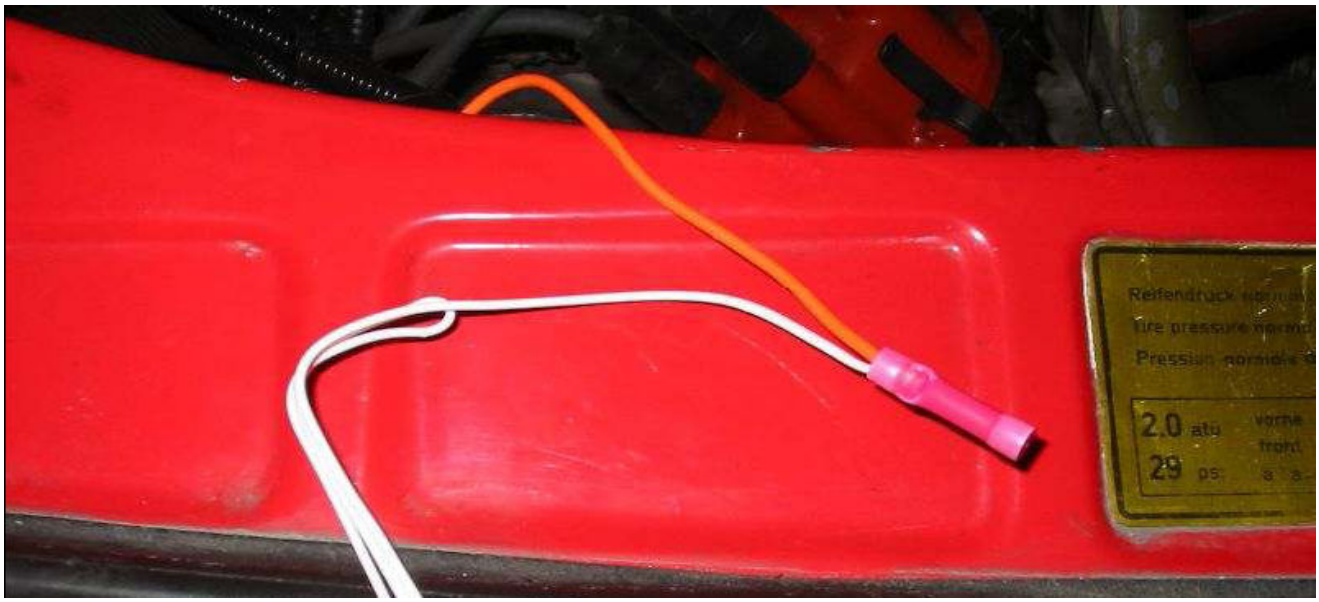


Figure 2: Butt connections

The wire harness from the LC-1 Controller is very long. It should be made as small as needed. Use an exacto knife to slit the black insulation. Then pull it back to expose the wires. Cut off the excess wire length not needed. Refer to the Picture below:

Figure 3: LC-1 wire harness

Once the installation is complete tuck the LC-1 Controller behind the Engine mount brace at the rear of the engine bay. Refer to the picture below.

Figure 4: LC-1 mounting location

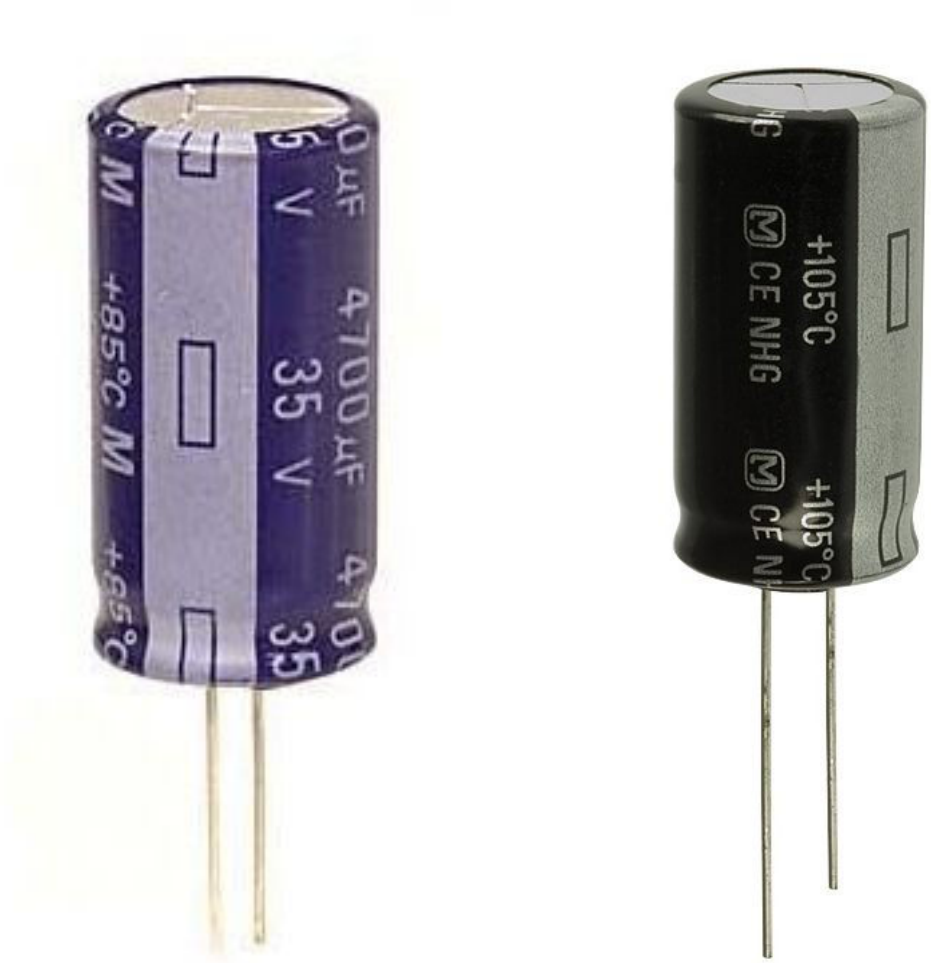
Figure 5: LC-1 mounting location

Power Supply Filter Capacitor

Testing has shown that the LC-1 is susceptible to power supply noise, which manifests in a "bouncing" O2 reading at the MegaSquirt input. Also, the Bosch CDI in the Porsche generates a lot of noise on the +12v power. It is therefore recommended to install a filter capacitor to filter out the noise on the +12V power to the LC-1.

An electrolytic capacitor around 4700uF rated at least 25volts (safer to have 35volts) will do the job. Note these capacitors are "polarized" which means the positive of the capacitor MUST be connected to the +12v side (same place as LC-1 RED wire) and the negative of the capacitor MUST be connected to the chassis (same place as LC-1 blue wire). If you reverse this, the capacitor will eventually explode.

This capacitor can be found a your local radio shack, or online at places like www.digikey.com. Below is a picture of a typical radial electrolytic capacitor that can be used (digikey part numbers 493-1884-ND, P5558-ND, 565-1327-ND are all parts that can be used and are also rated at the higher 105C instead of the typical 85C). In this case the white line identifies the negative terminal. You will have to extend the wires by crimping (or soldering) some red and black wires with insulation on the capacitor leads. Make sure the capacitor leads due not short to each other or anything else.



Calibration Switch and LED

Refer to the LC-1 Installation guide for wiring the Calibration switch and LED.

Once wired the LED should be installed in a visible location in the engine bay. This way you can have a quick look to see if the Wide Band O2 controller is operating. Below is one good spot for it.

Figure 6: LC-1 LED location

The calibration switch doesn't need to be easily accessible, as the calibration operation isn't done very often. Placing in behind the black cover is a good spot.

Figure 7: LC-1 Switch Location

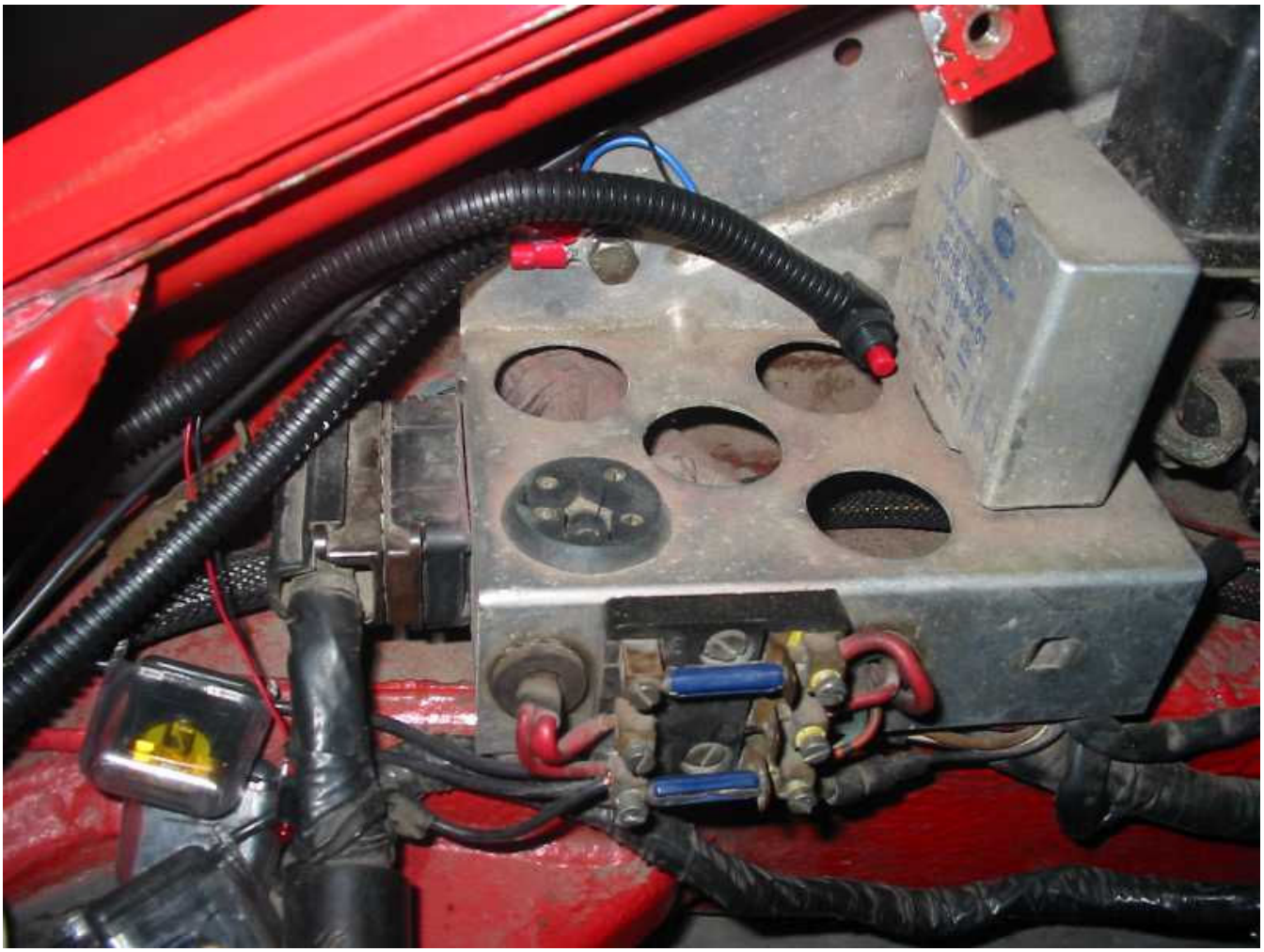


Figure 8: LC-1 Switch Location

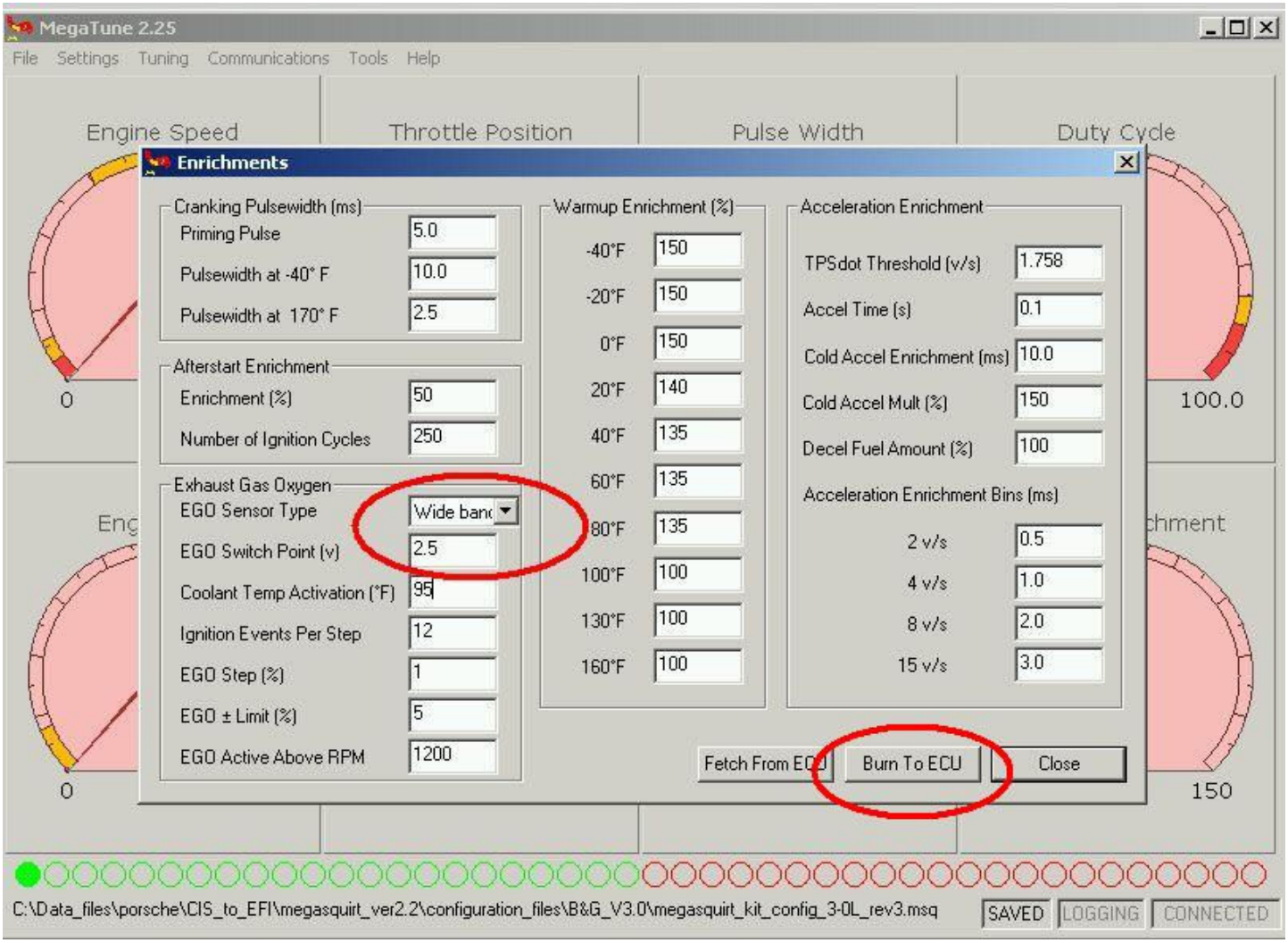
MegaSquirt Changes

The existing configuration that came with your MegaSquirt unit assumed a narrow band sensor. This needs to be changed to wide band O2 sensor.

- Start the MegaTune software on your laptop.
- Conect the serial port of the laptop to the MegaSquirt unit
- Turn the ignition key to the "run" position (you don't need to start the engine)
- Once the key is turned MegaTune will "beep" indicating it has connected to MegaSquirt and loaded all the configuration information.
- Go under "Settings" and click on "Enrichements"

- In the "Enrichements" window you need to change the "EGO Sensor Type" to "Wide Band"
- In the "Enrichements" window you need to change the "EGO switch point (V)" to "2.5".
- Click "Burn to ECO" once this is complete.

Refer to the picture below for details:



MegaTune Changes

If you are not already doing so, you should upgrade to MegaTune 2.25. Once you do this you need to change the O2 sensor type in the configurator to wide band O2.

- Start the MegaTune Configurator (via desktop link or through PROGRAMS, MegaSquirt)
- Click on your vehicle. If you didn't change the name, it will be called "car1"
- Click on "settings . ini"
- Click on "Settings"
- Click on "LAMBDA_SENSOR"
- On the the top right it will indicate "NARROW_BAND_EGO—Narrowband Sensor"
- Click on this this and change it to "INNOVATE_LC1_DEFAULT – Innovate LC-1 default, 0-5v = 0.5 –1.5 lambda"
- Click File and then Save.

That's it. Refer to the picture below as a reference: