BOSS GARAGE

Honduino OBD2A - V1

Before connecting the ECU to the car

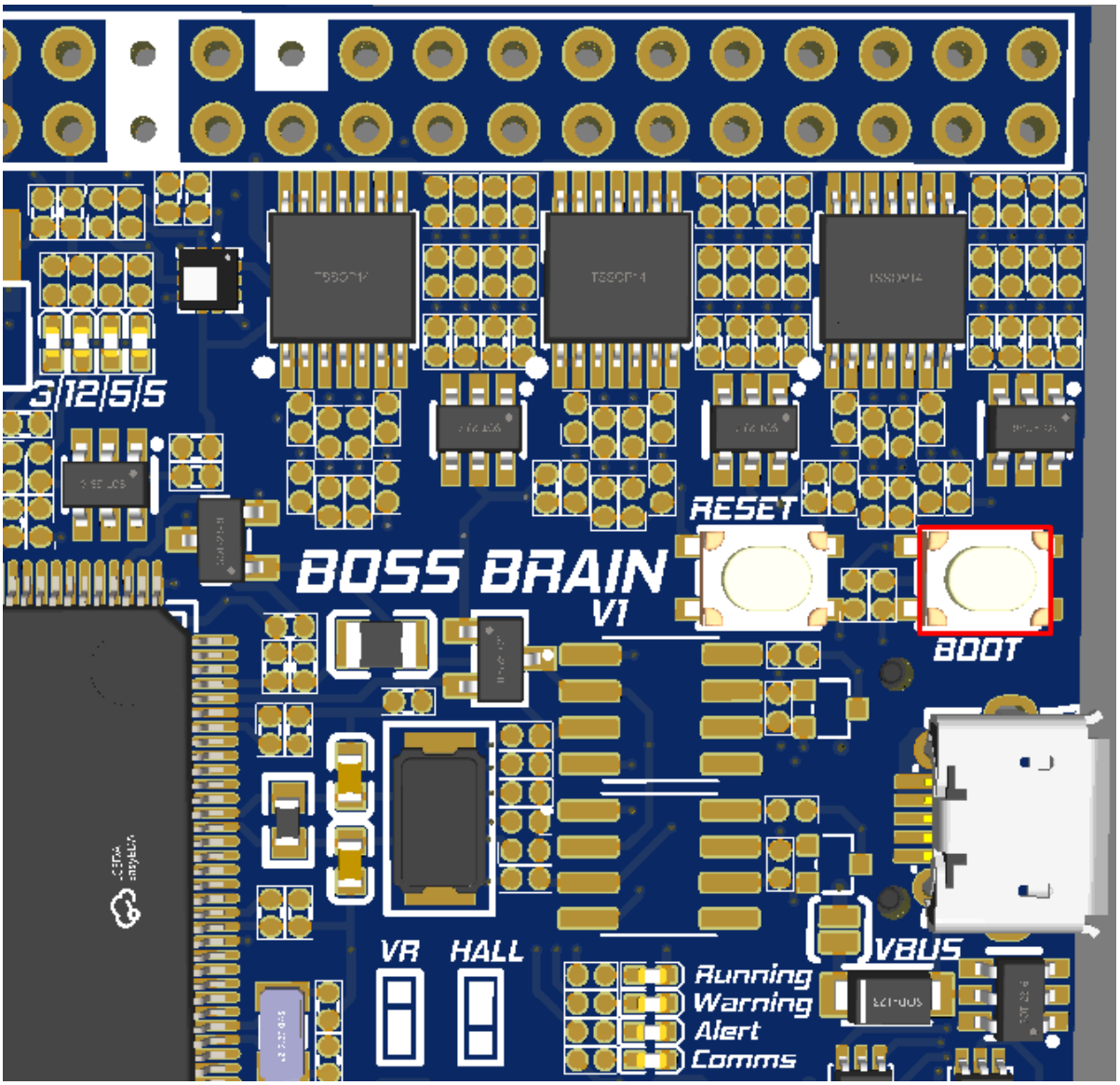
Before installing the ECU into the vehicle some pre-installation configuration must be performed.

1) Update the firmware (optional)

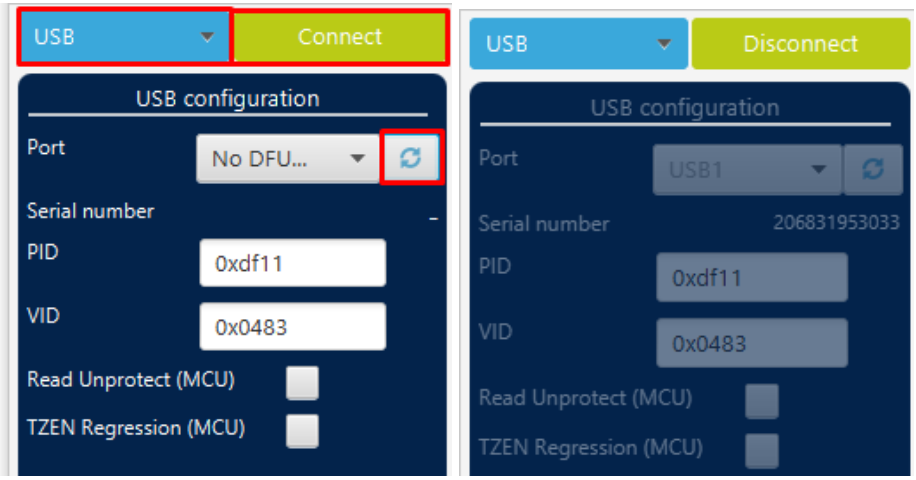
1.1. Download and install STM32CubeProgrammer V2.14

1.2. Download the latest FIRMWARE

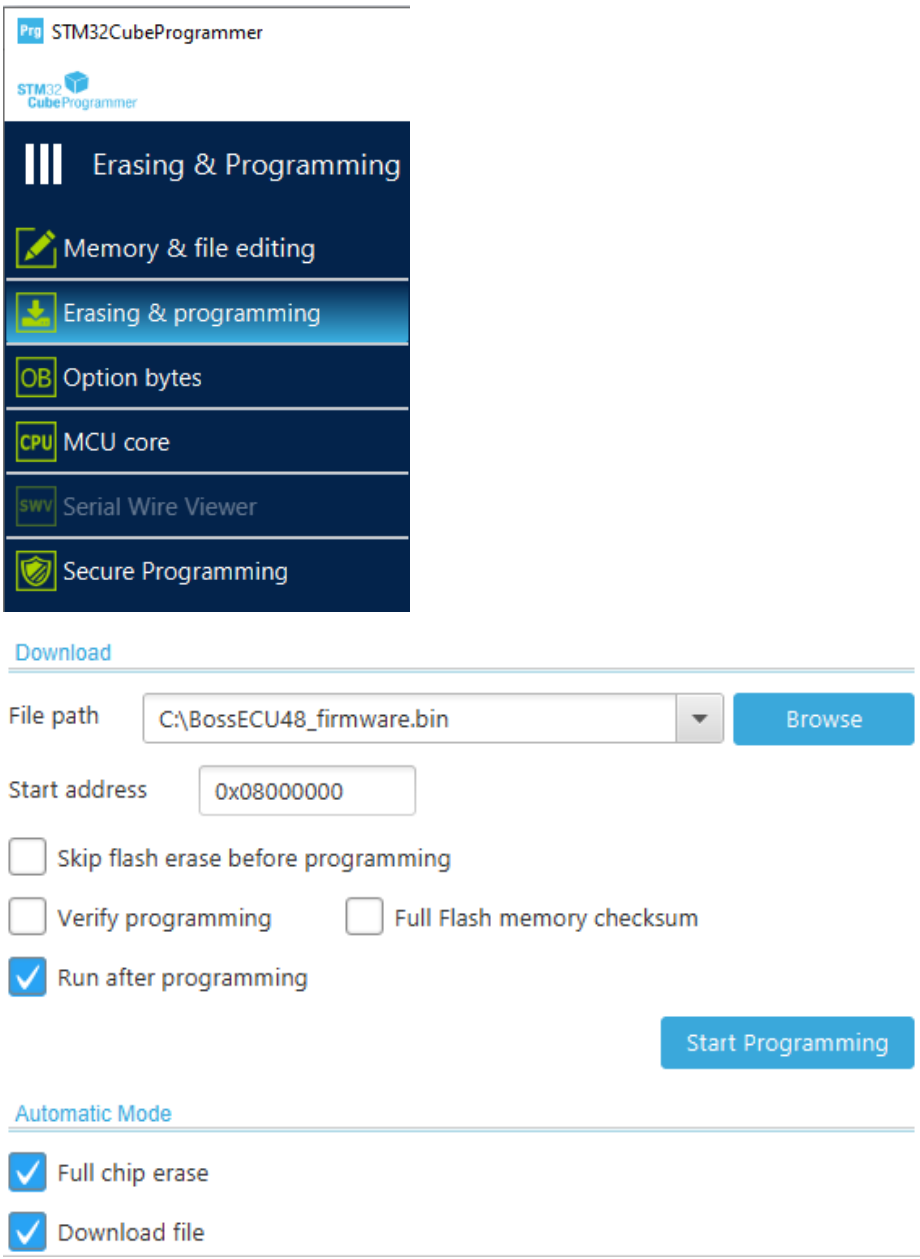
1.3. Click on the **BOOT** button on the board and plug the USB cable into the computer



1.4. In STM32CubeProgrammer, select USB, refresh the devices, select the ECU, and connect.



1.5. Go to the “Erasing & programming” menu, browse, and select the firmware.



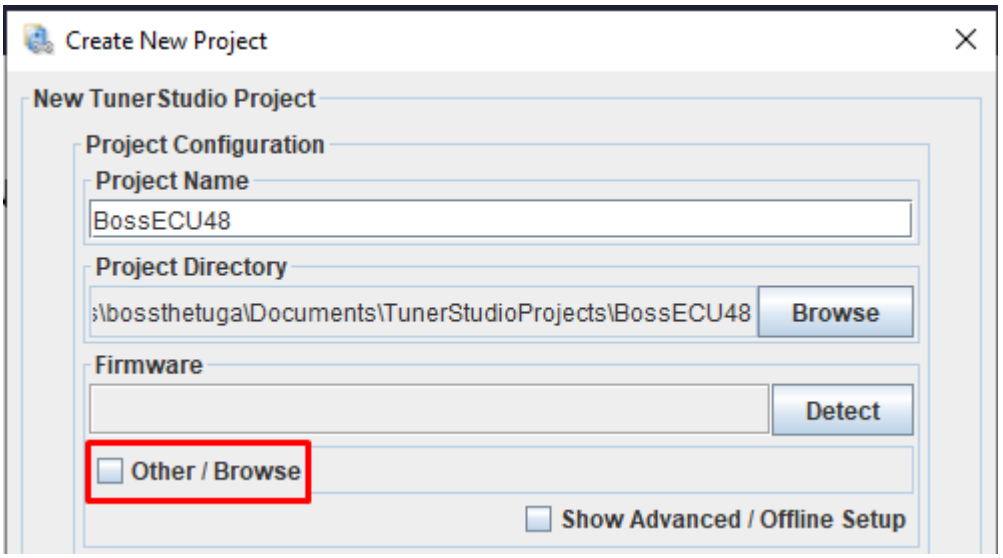
1.6. Insert the start address: 0x0800000
1.7. Select the boxes: “Run after programming”, “Full chip erase” and “Download file”
1.8. Click “Start Programming”
1.9. You successfully updated the firmware! Now, close all the STM32CubeProgrammer windows and restart the ECU by clicking the RESET button or unplug and plug the USB cable.

2) Connecting to the software

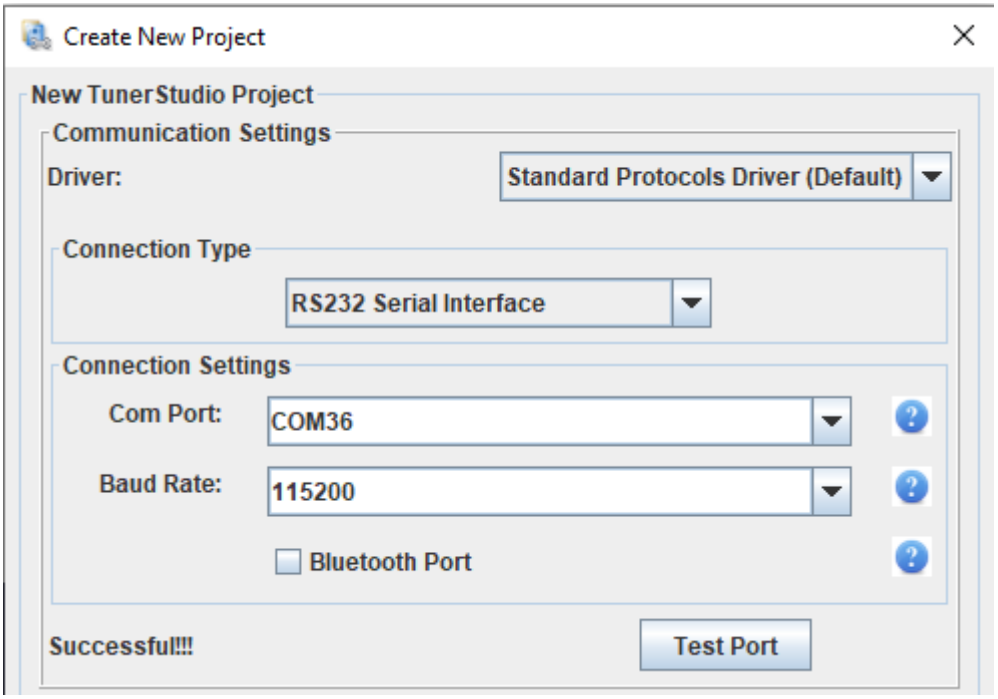
2.1. Download and install: TunerStudio

2.2. Plug the USB, it will automatically open a virtual drive with a file rusefi.ini.zip, extract it, and save it on your desktop.

2.3. Open TunerStudio, create a new project, click “Other / Browse” and select the firmware.ini file extracted before.

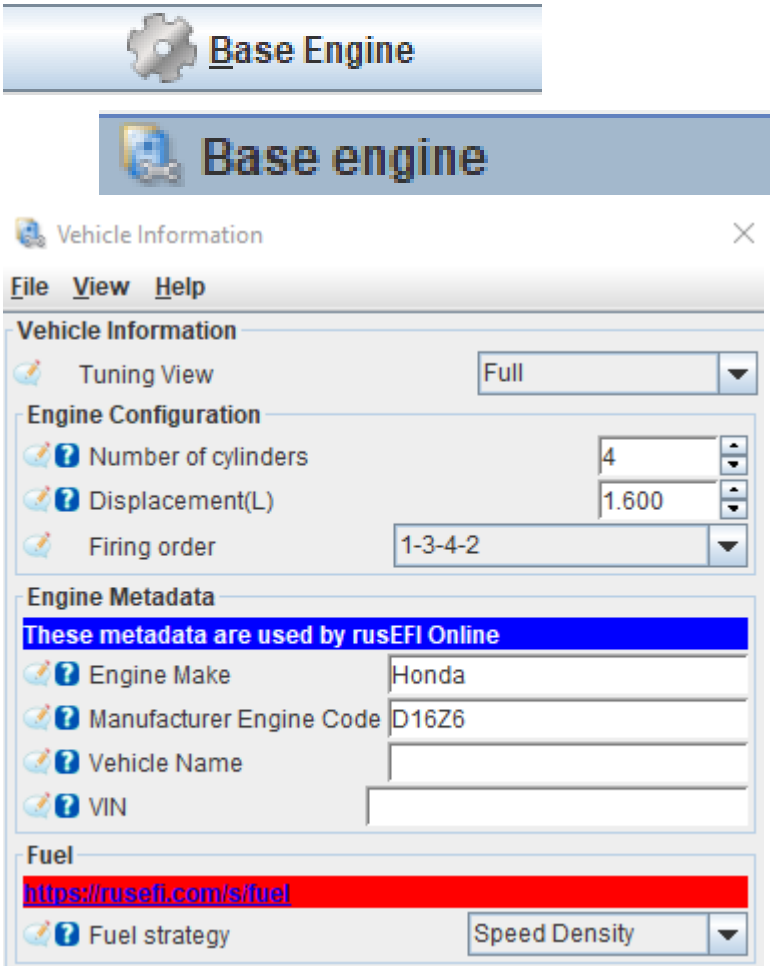


2.4. Use RS232 Serial for USB connection or Bluetooth direct



3.1) Base settings

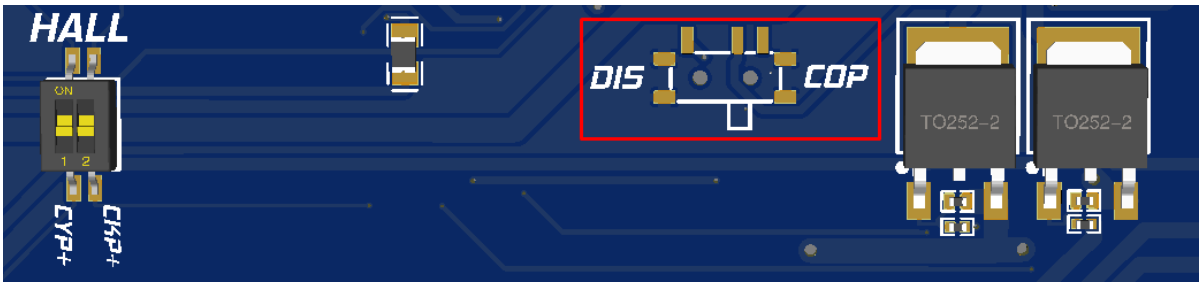
Configure the number of cylinders, engine displacement in liters, firing order, and fuel strategy.



3.2) Ignition (Distributor / COP)

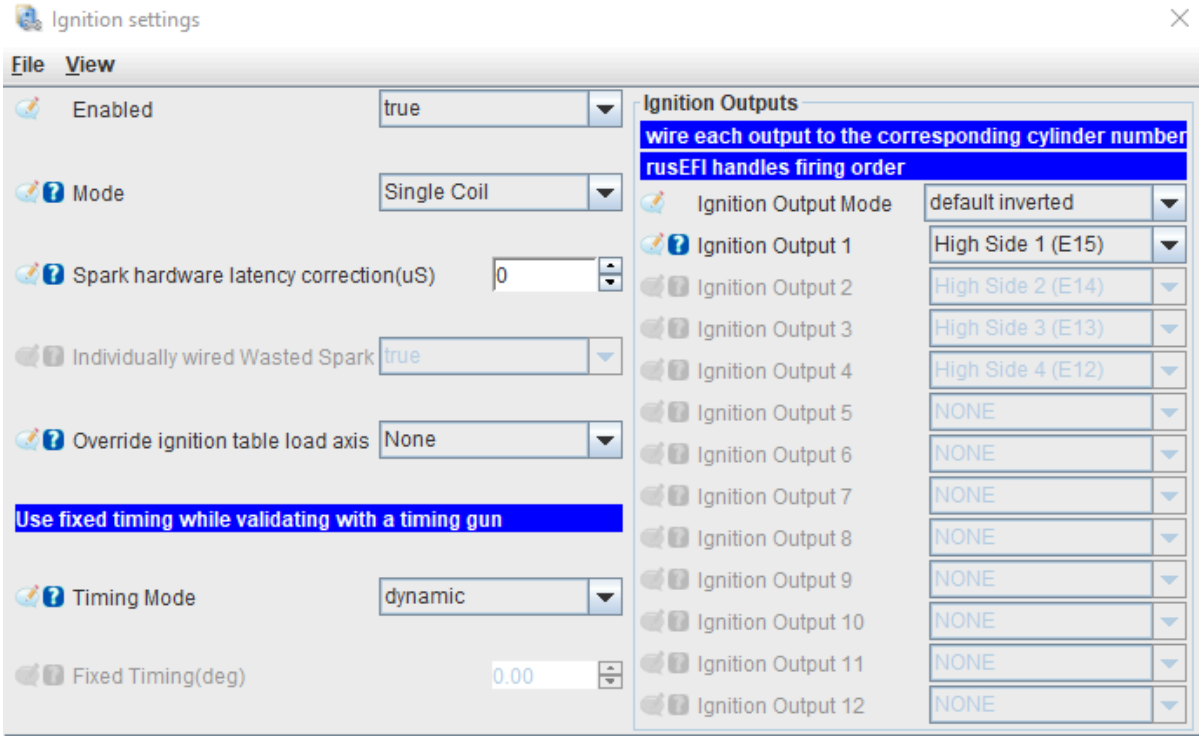
WARNING 1: Be sure to read all sections on ignition, so you don't damage any coils.
WARNING 2: Use only **smart coils** or dumb coils with external igniters.

3.2.1 The ICM switch needs to be adjusted based on the ignition setup. **(CRITICAL)**



3.2.2 Configure the **Spark Mode** and **Output Mode** **(CRITICAL)**

WARNING 3: If the output mode isn't configured correctly, the coil(s) will overheat and potentially get damaged. If the ignition is ON and the coil starts to heat up, the configuration is likely incorrect.



Spark mode:

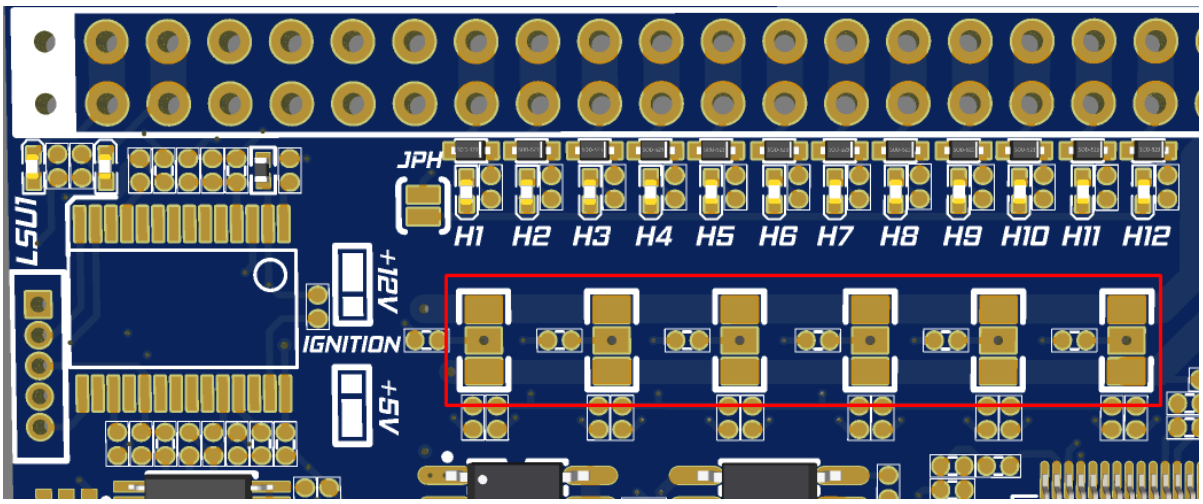
- Single coil: Distributor
- Individual coils: Smart coils in sequential mode

Ignition output mode:

- Honda distributor coils: Default inverted (Going High)
- Most of the smart coils: Default (Going Low)

3.2.3. **Ignition voltage output:** select the voltage for each pair of ignition output via the jumpers:

H1 + H2 **H3 + H4** **H5 + H6** **H7 + H8** **H9 + H10** **H11 + H12**



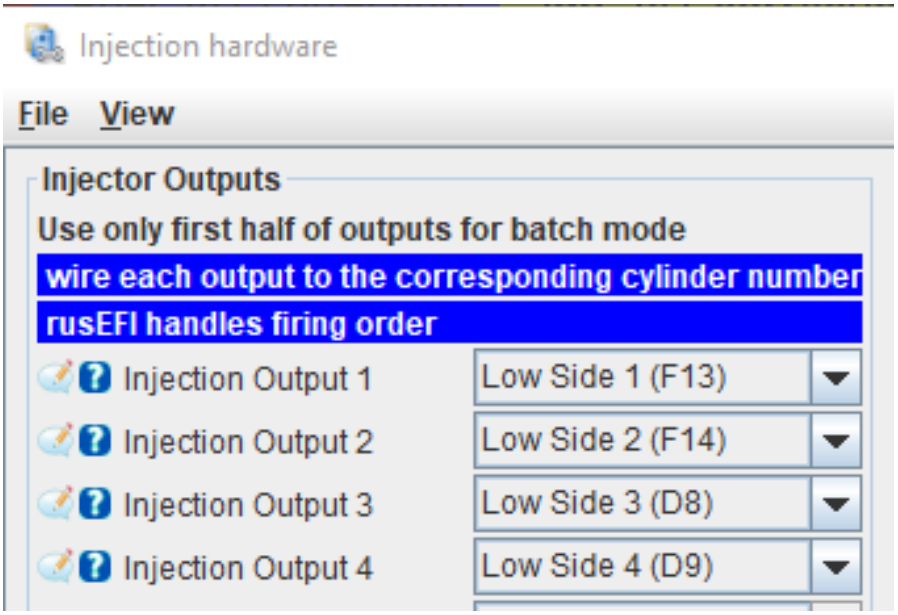
- Honda distributor: 12V
- Most of the smart coils: 5V

3.2.4. **If using individual coils:** Check ECU pinout and connect each coil signal wire.

3.3) Injection

WARNING: Use only high-impedance injectors (> 8 ohms) or low impedance with a resistor box.

3.3.1 Configure the outputs that correspond to each cylinder.



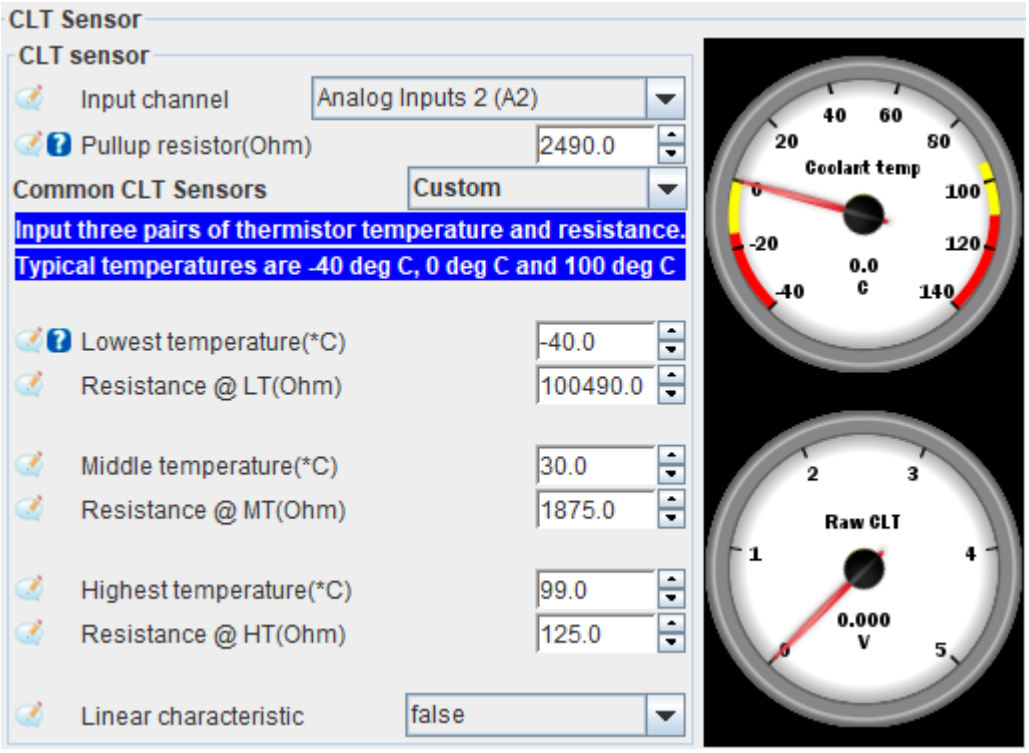
3.3.2 Injector base settings

- Injection mode
- Injector flow

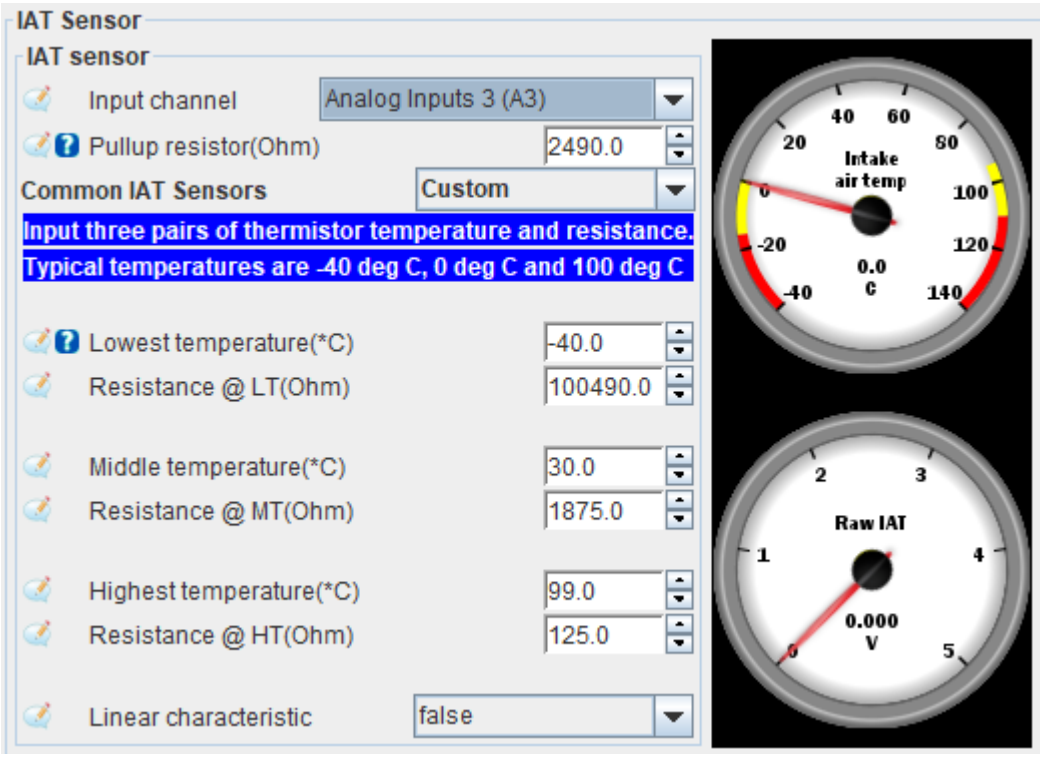
- Compensation mode
- Dead time

3.4) Temperature sensors

3.4.1 Coolant temperature sensor

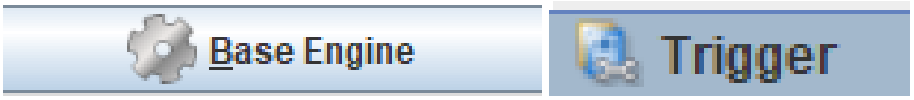


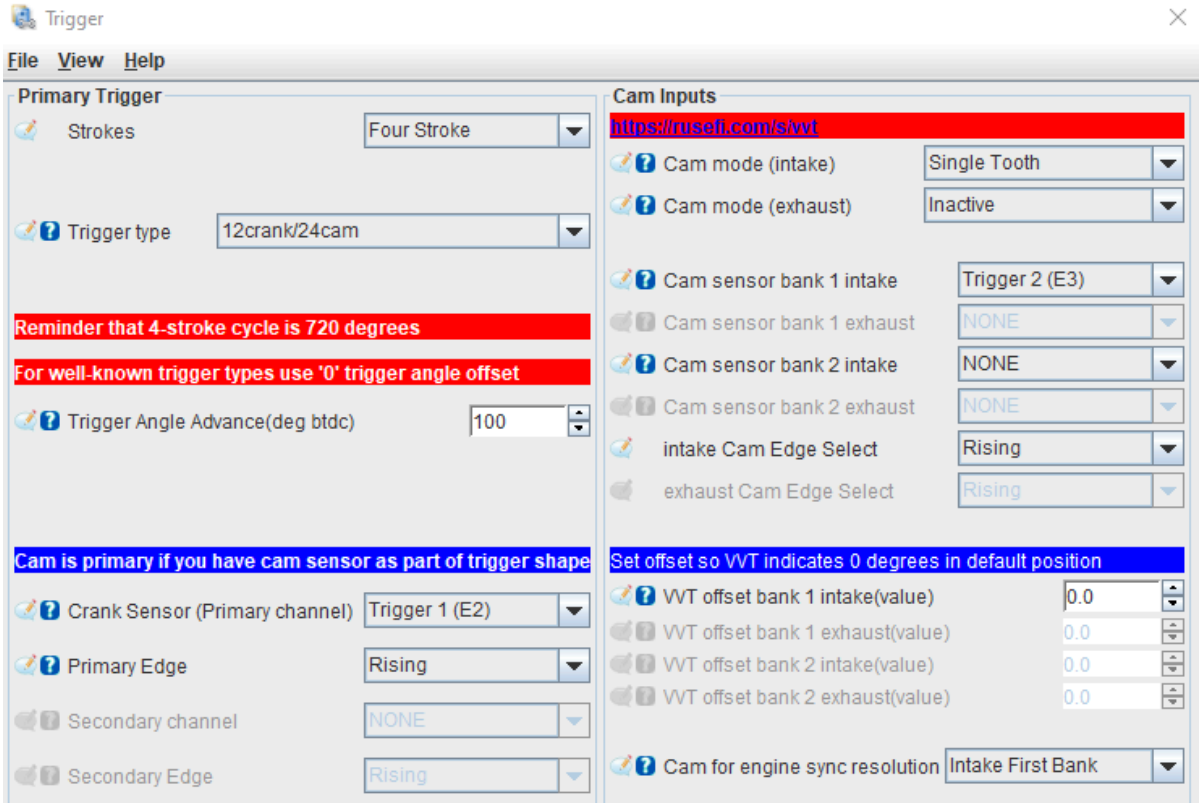
3.4.2 Intake temperature sensor



3.5) Trigger wheel

3.5.1 Configure the trigger wheel according to your distributor:

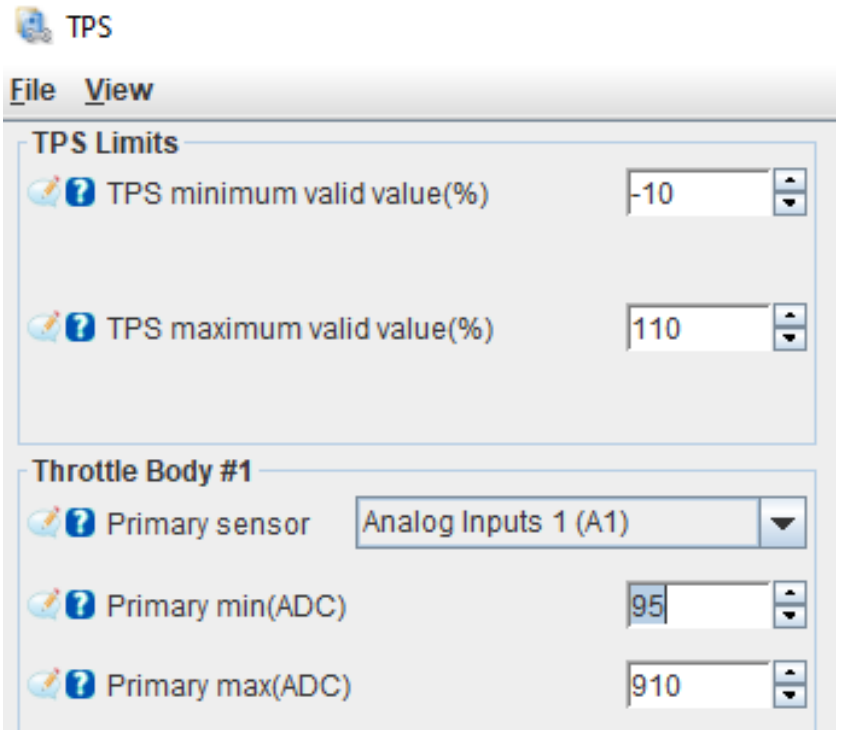




Inputs	Trigger wheel
Trigger 1	24 tooth on cam
Trigger 2	1 tooth on cam
Trigger 3	12 tooth on crank

Connect the ECU to the car

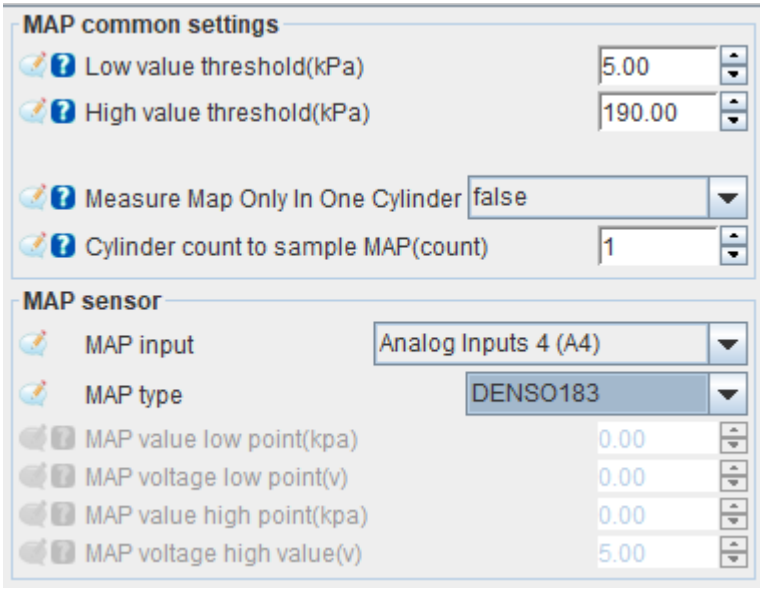
4) Throttle Position Sensor



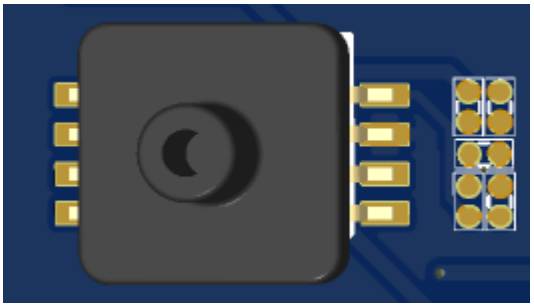
Adjust the **Primary minimum (ADC)** and **Primary max (ADC)** until the TPS reads 0% without pressing the throttle and 100% at full throttle.

5) MAP sensor

Any MAP sensor can be used, but the most used is the stock one on input A4.

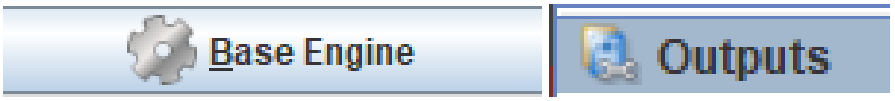


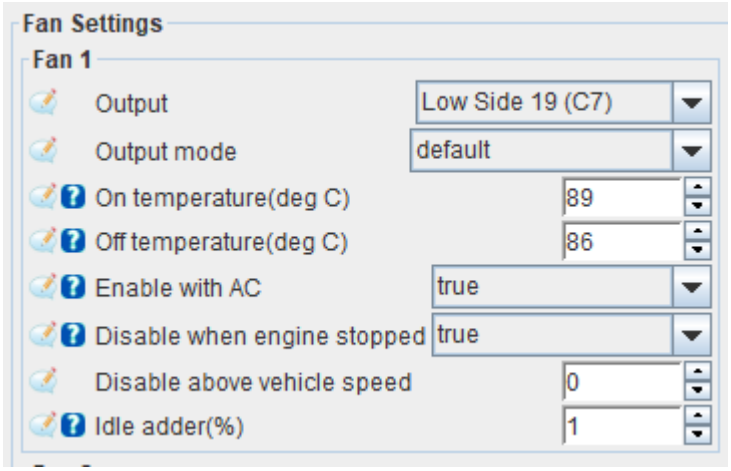
You can also solder an onboard MAP sensor to A5 or connect to the onboard auxiliary inputs.



6) Radiator fan

A valve controls the radiator fan mechanically, but the ECU can activate it early or independently.

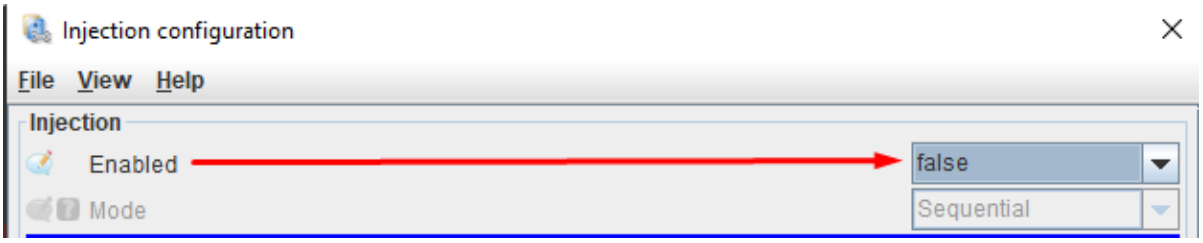




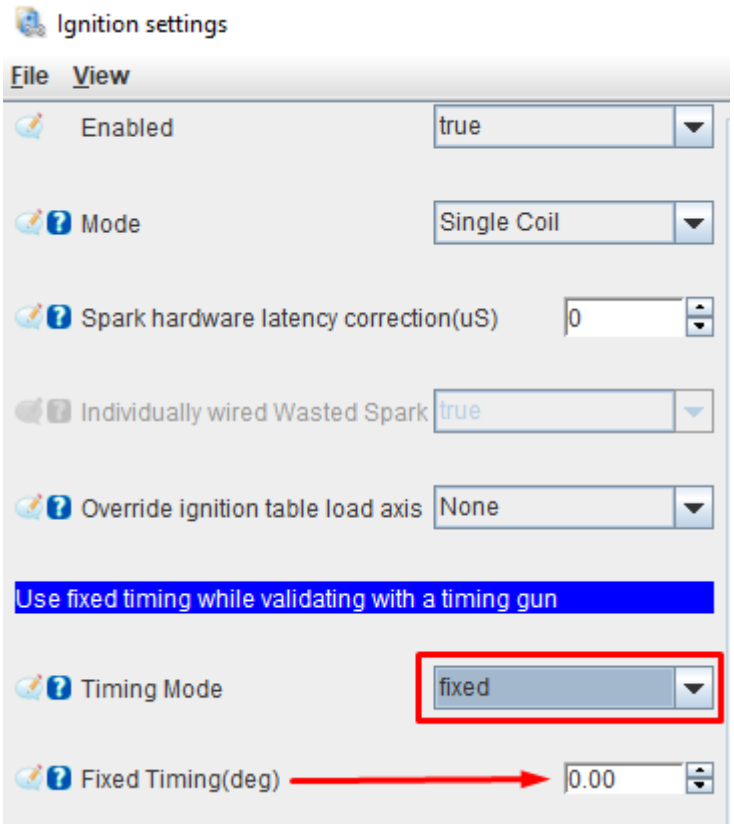
7) Ignition base timing (same as the rotation of the distributor)

To sync the ignition timing with the engine, it's necessary to adjust with the help of a [Timing Light gun](#).

7.1. Disable the injection **(if the car starts, skip this step)**

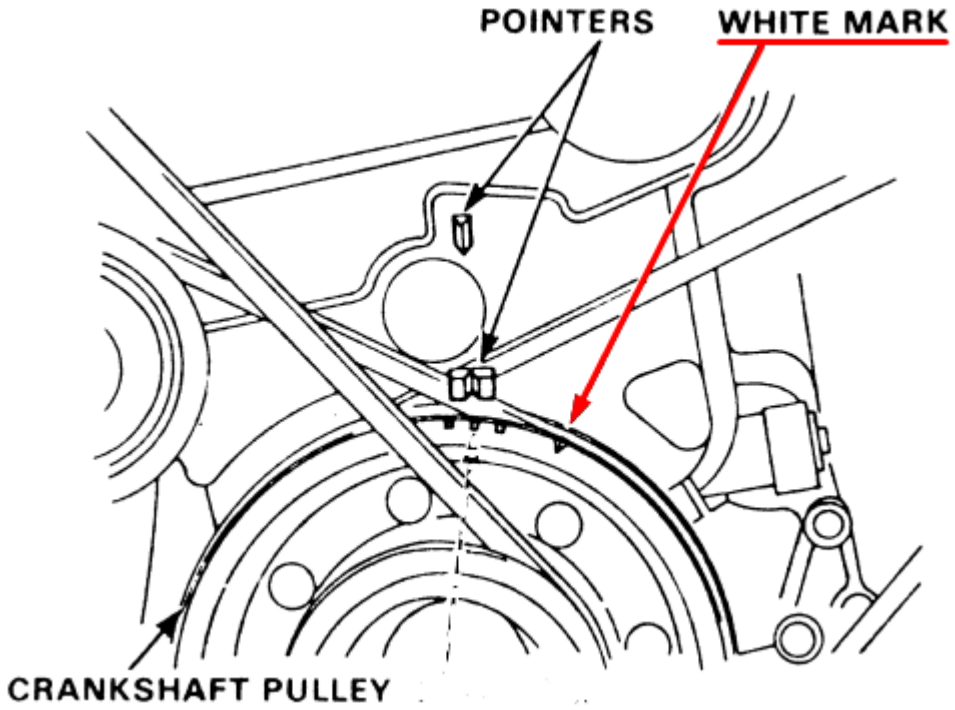


7.2. Change the timing mode from **dynamic** to **fixed**, so the ECU fires the coil always on the 0-degree angle.



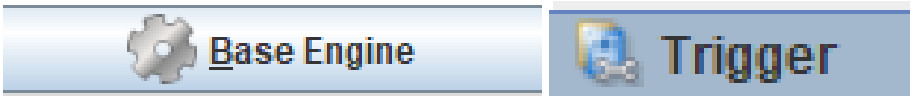
7.3. Use a white sharpie to **mark the 0-degree mark** on the crank pulley.

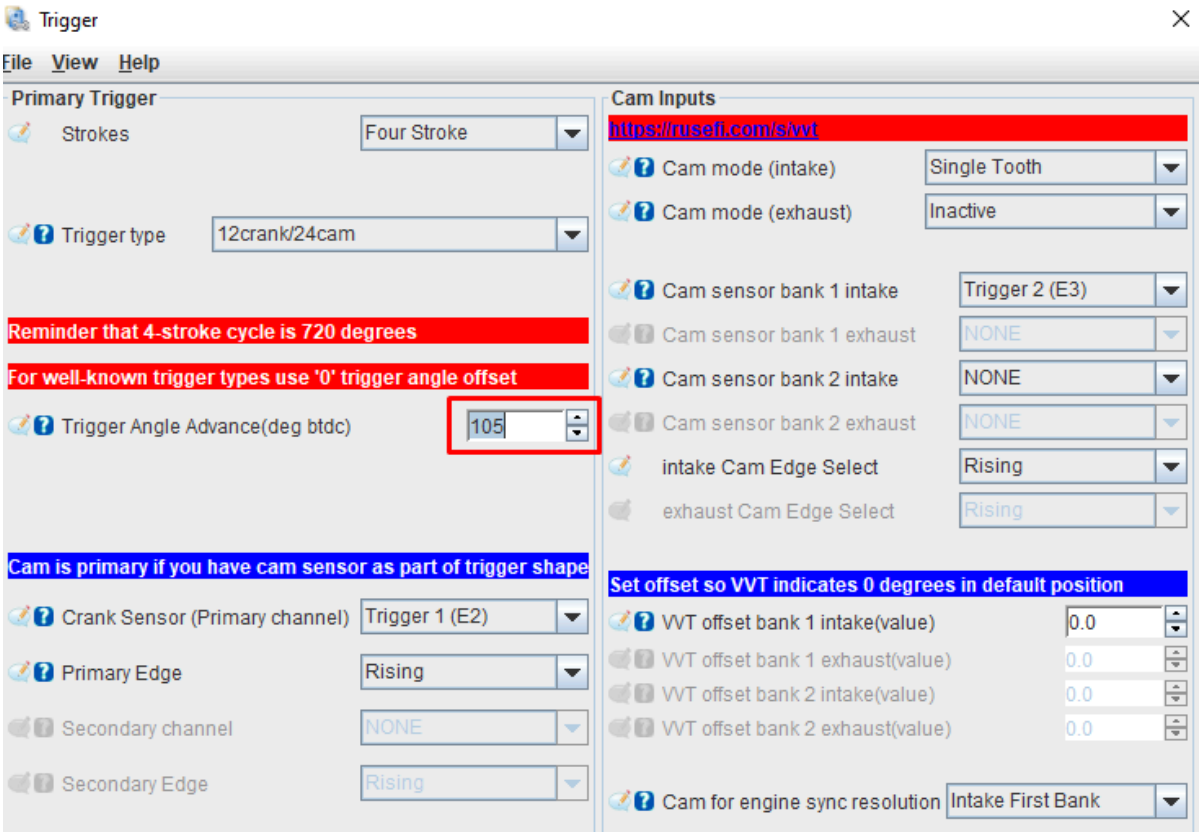
The crank pulley has four marks, with the alone mark of the four being 0 degrees (TDC).



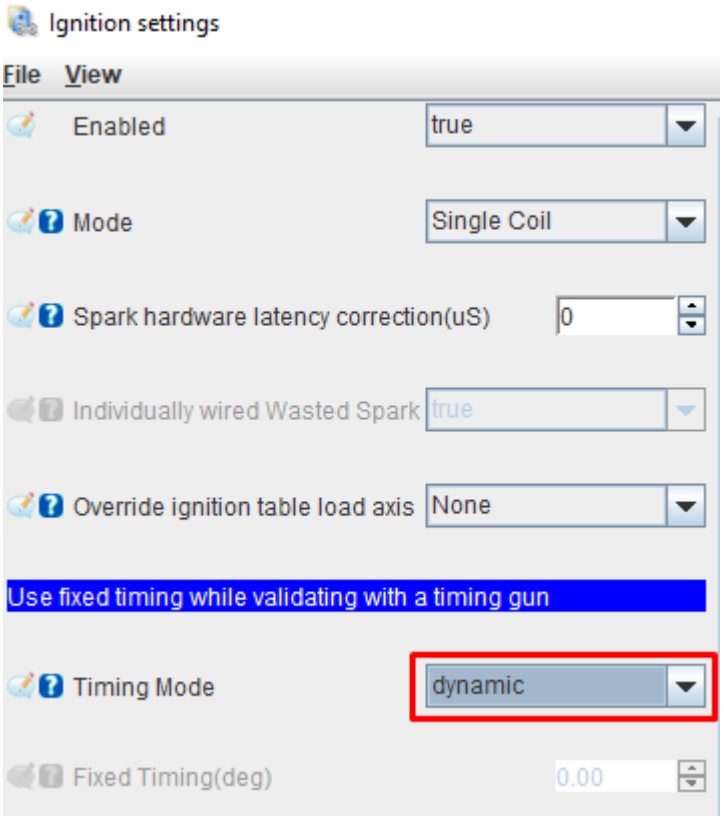
7.4. Attach the timing light clamp to spark plug wire 1, ensuring the arrow points toward the spark plug.

7.5. Adjust the **Trigger Angle Advance** value until the 0-degree mark on the crank pulley aligns with the pointer on the distribution cover.





7.6. Unlock the timing, so the ECU sends the ignition table values.

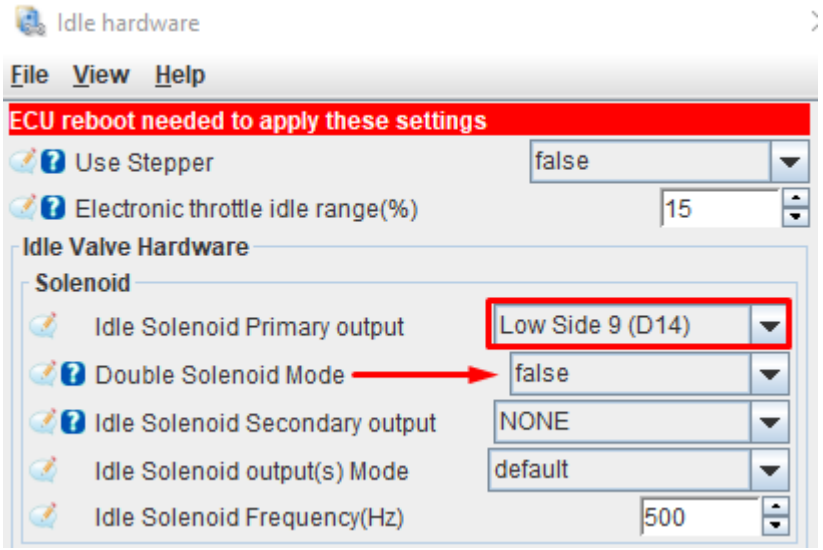


7.7. **The timing is synced,** now start your car 🥳🥳🥳

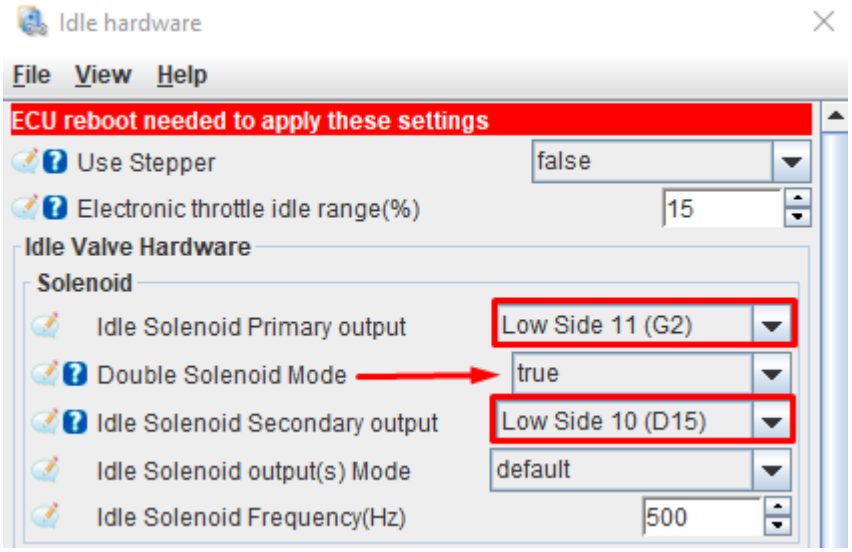
8) Idle control

8.1. Configure between 2 or 3 wire Idle Valve.

2 wire Idle Valve (D16Y8)

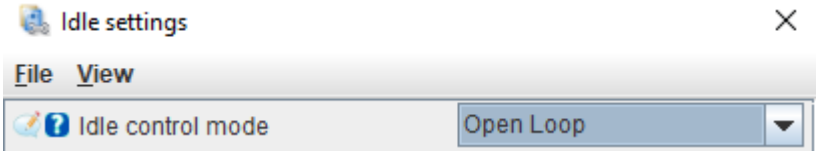


3 wire Idle Valve (D14Z4)

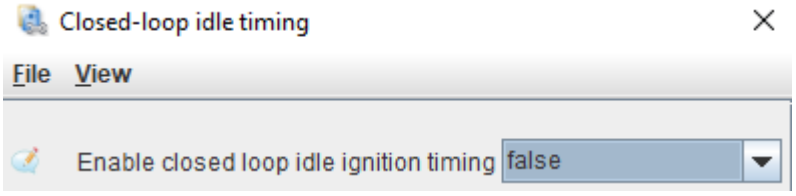


8.2. To adjust the idle make sure **closed loop idle mode** and **closed loop idle timing** are disabled.

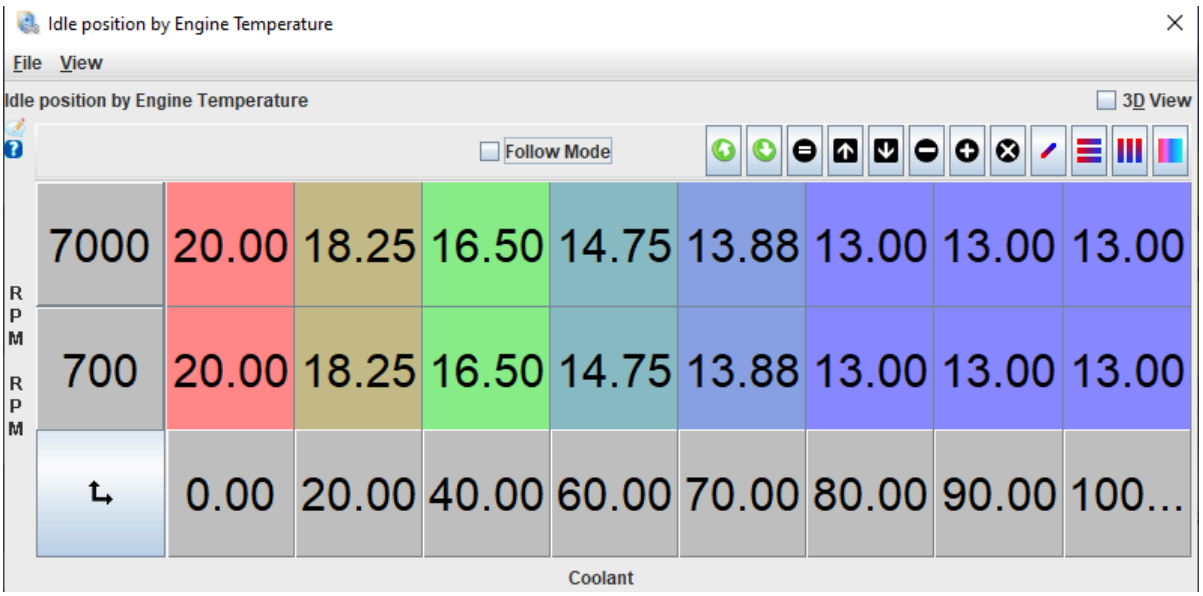
Open loop idle control mode:



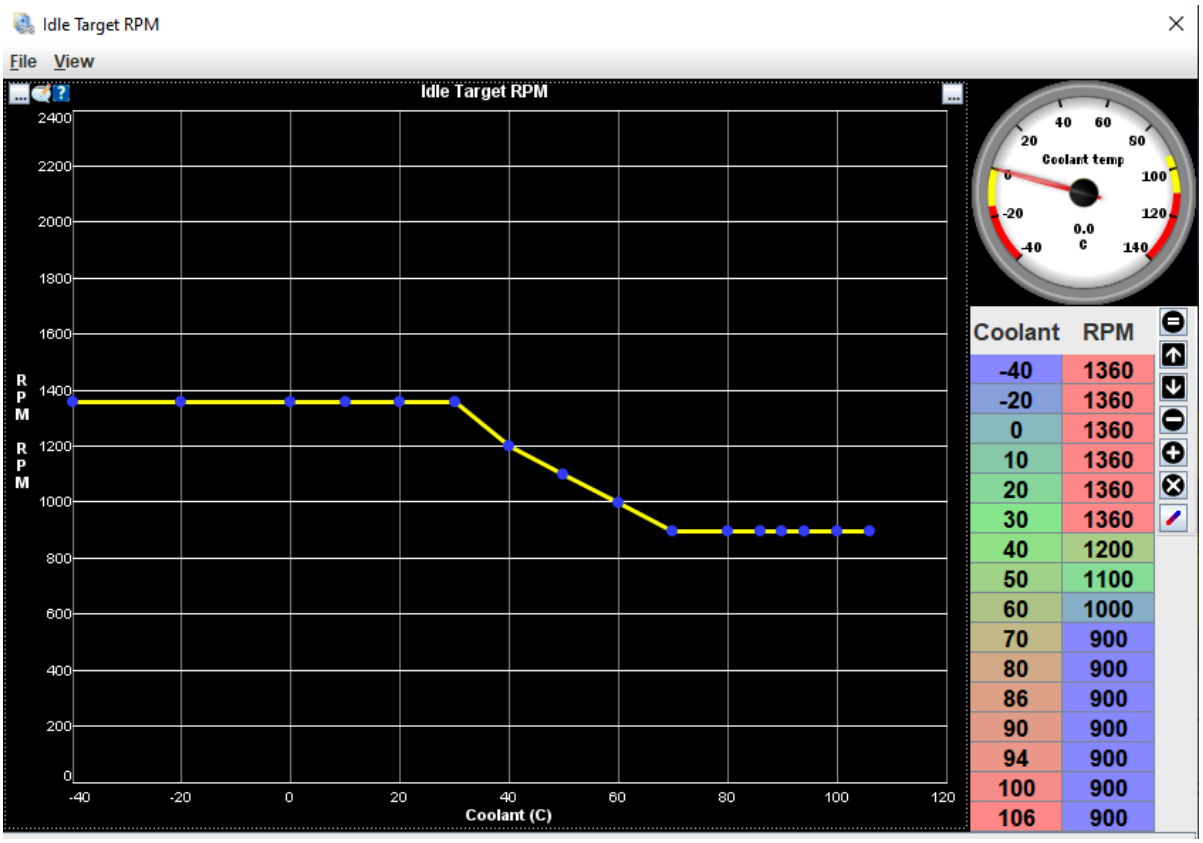
Disabled closed loop Idle timing:



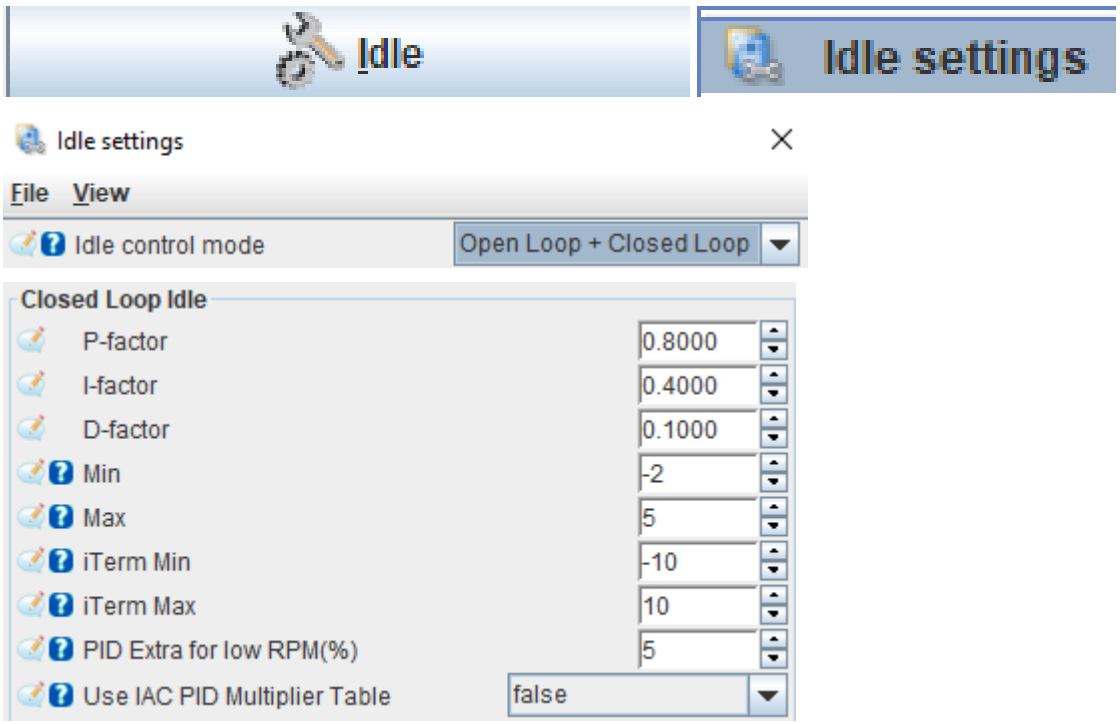
8.3. Adjust the open loop idle table



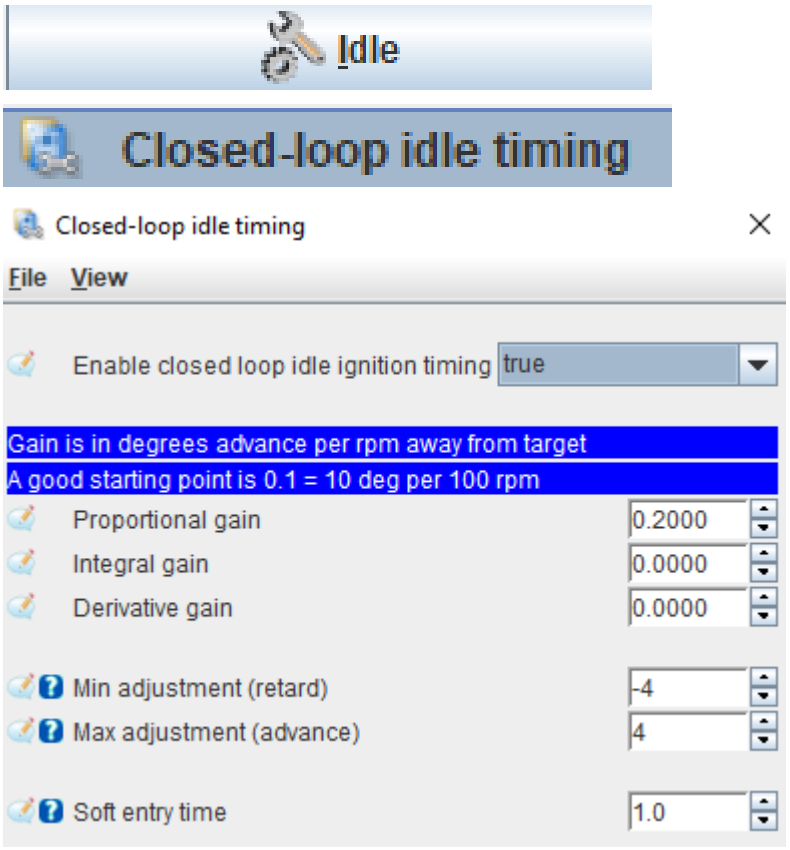
8.4. **Idle Target RPM** is used for closed-loop idle modes.



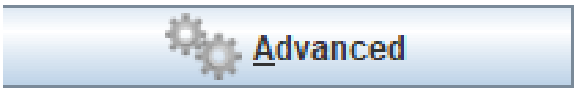
8.5. **Closed-loop idle** adjusts the idle by a PID algorithm.

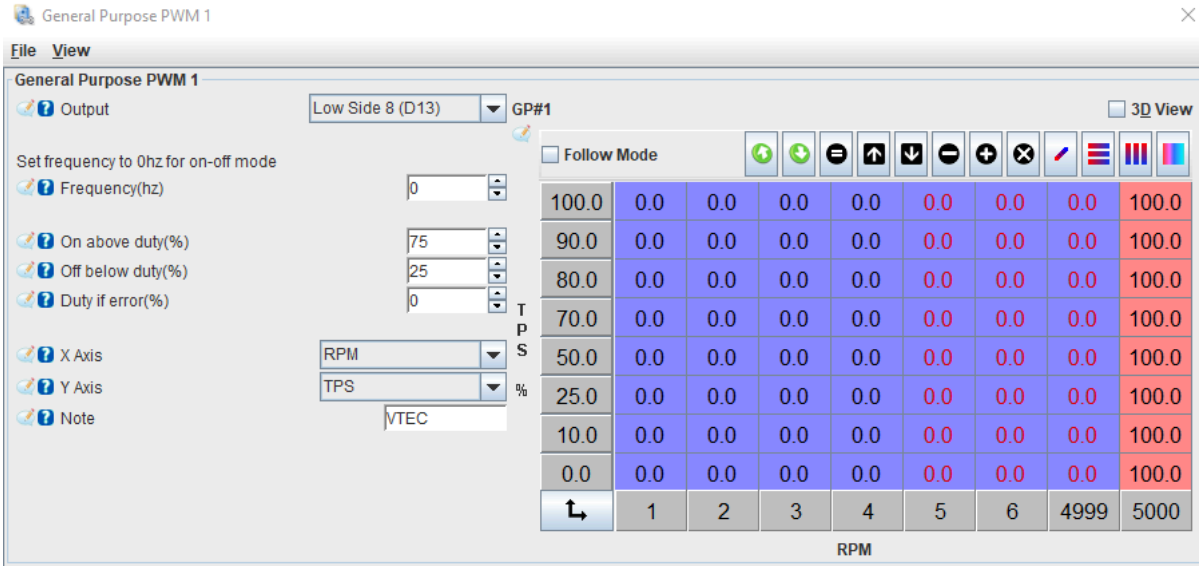


8.6. **Closed-loop idle timing** adjusts the idle by advancing or retarding the ignition timing.



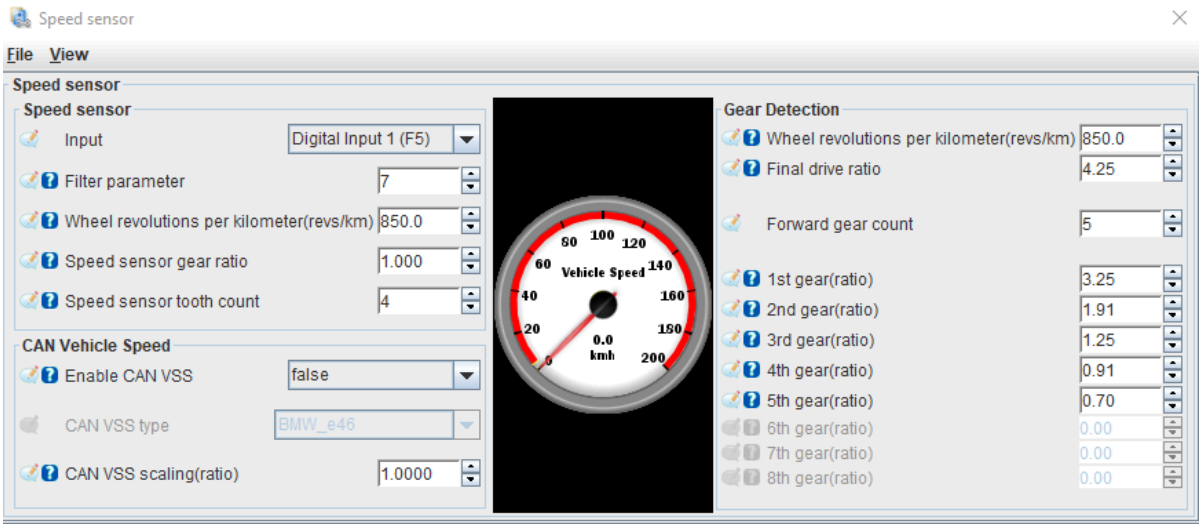
9) VTEC solenoid



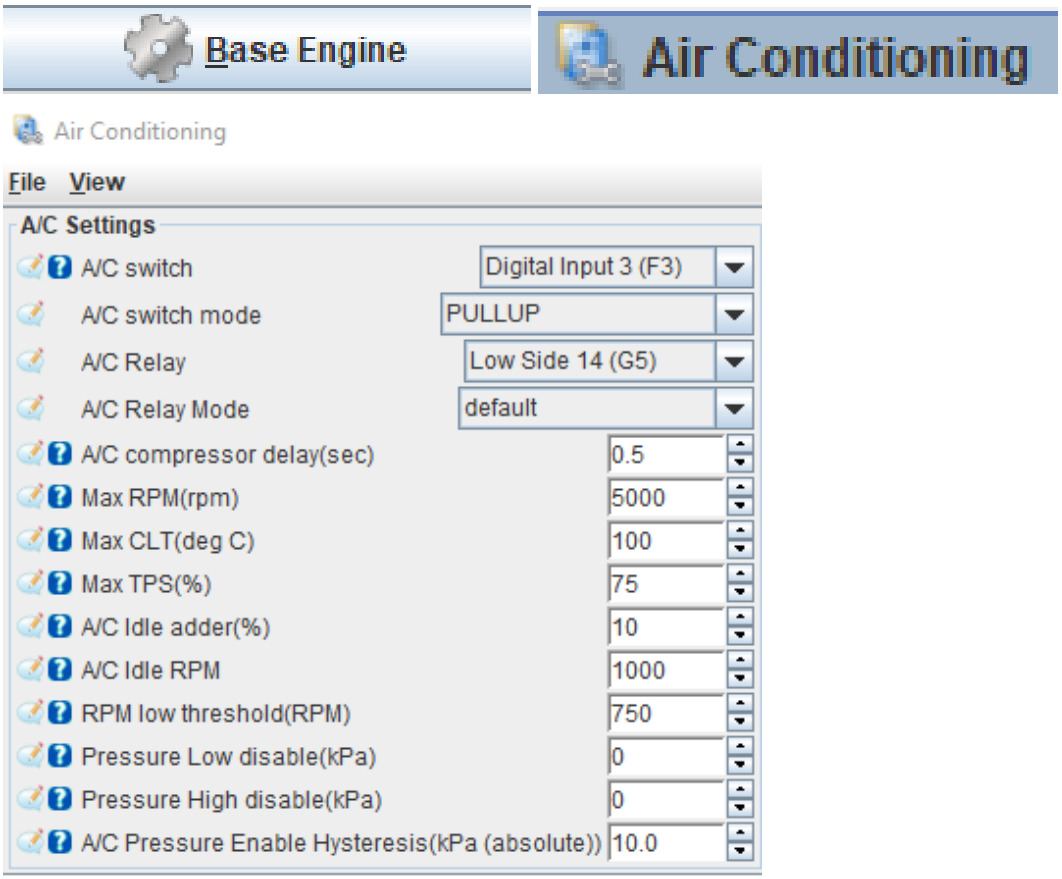


0 = OFF
100 = ON

10) Vehicle Speed Sensor



11) Air Conditioner

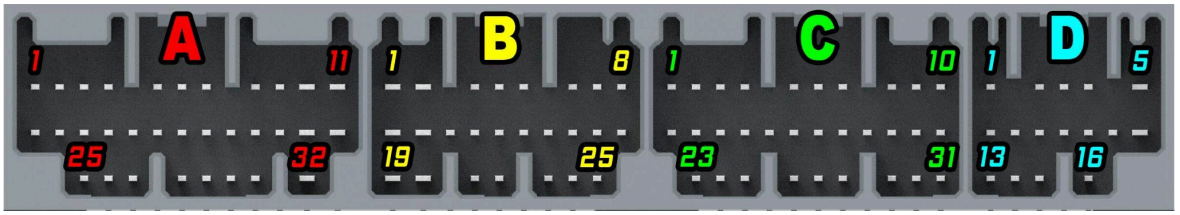


Extra features

12) Wideband

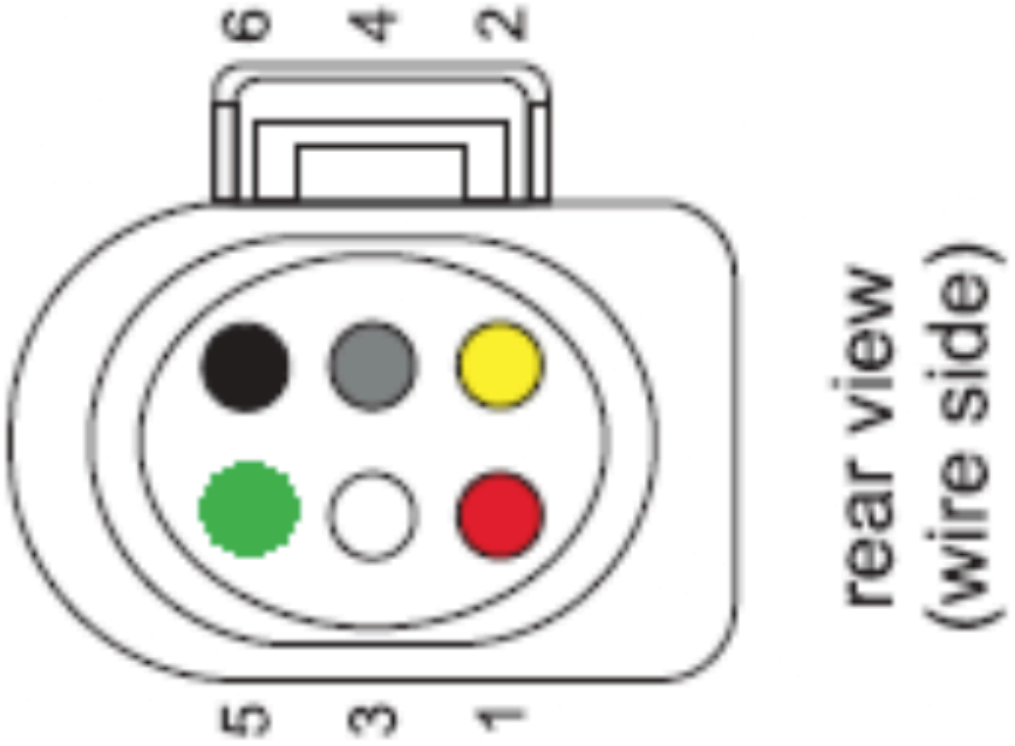
To tune the VE table, a wideband sensor is necessary for measuring the air-fuel ratio.

12.1. You can either connect an LSU 4.9 sensor directly to the onboard controller or use a 0-5V signal from an external controller via an auxiliary analog input.

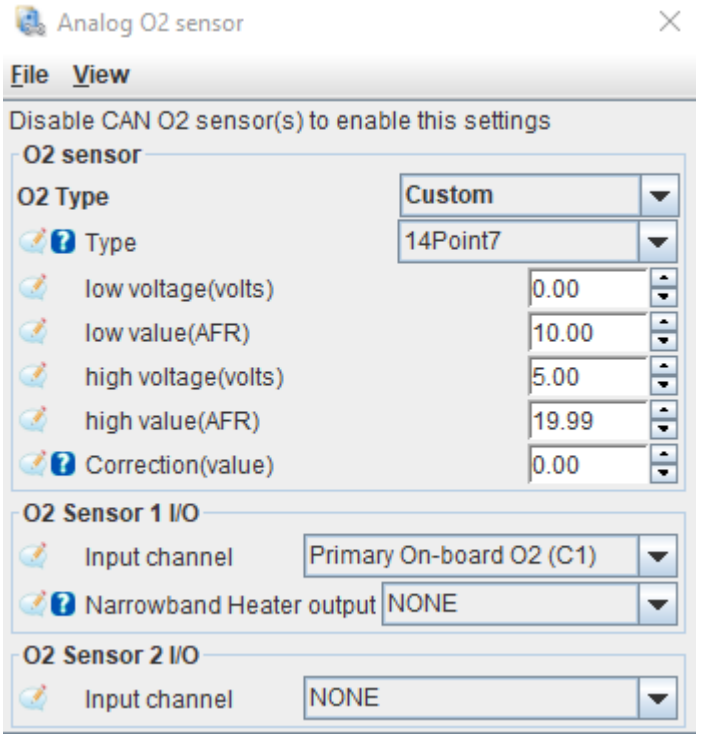


ECU Connector	LSU 4.9 Connector
B20	5 (IA)
B21	6 (NERMEST)
B22	1 (IP)
B23	2 (VGND)

B24	3 (HEATER-)
B25	4 (HEATER+)



12.2. Configure the wideband linear output values

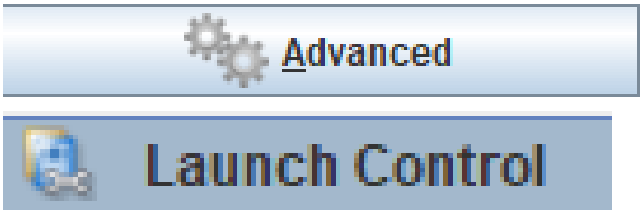


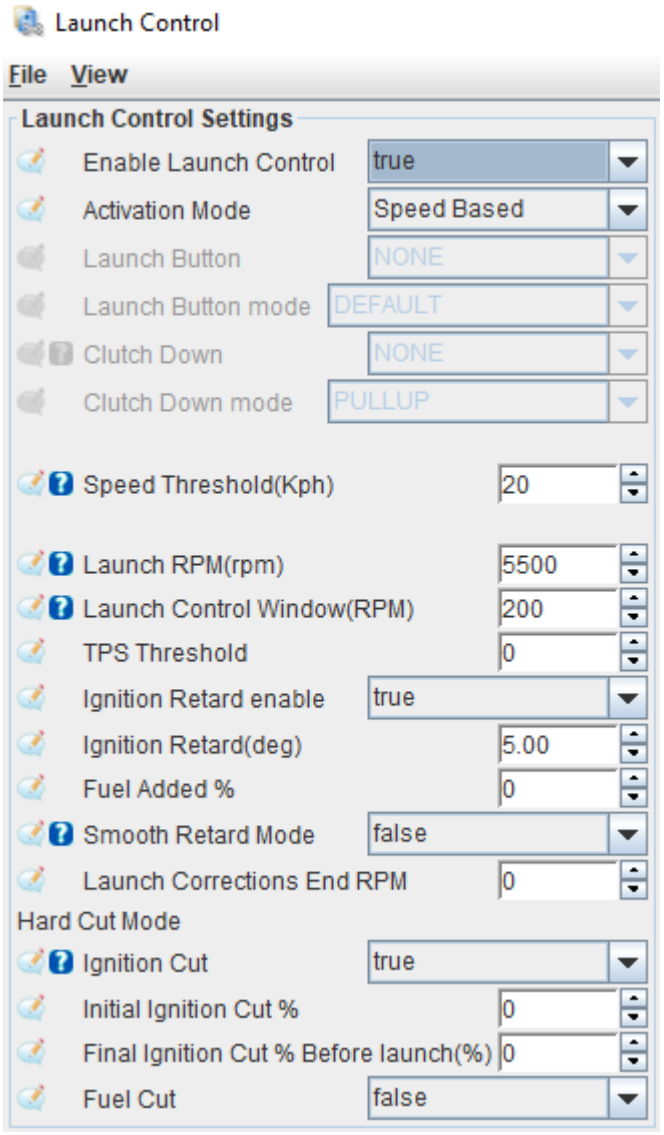
13) Launch control

The launch control is used to launch… **I mean, spit flames, a lot of 🔥🔥🔥!**

13.1. Select the activation mode: it can be Speed-based, Launch, Clutch, or Brake button.

If you choose to use a button, some cars have clutch switches, but most will need to be wired to a switch that sends a ground signal to an unused Digital Input.



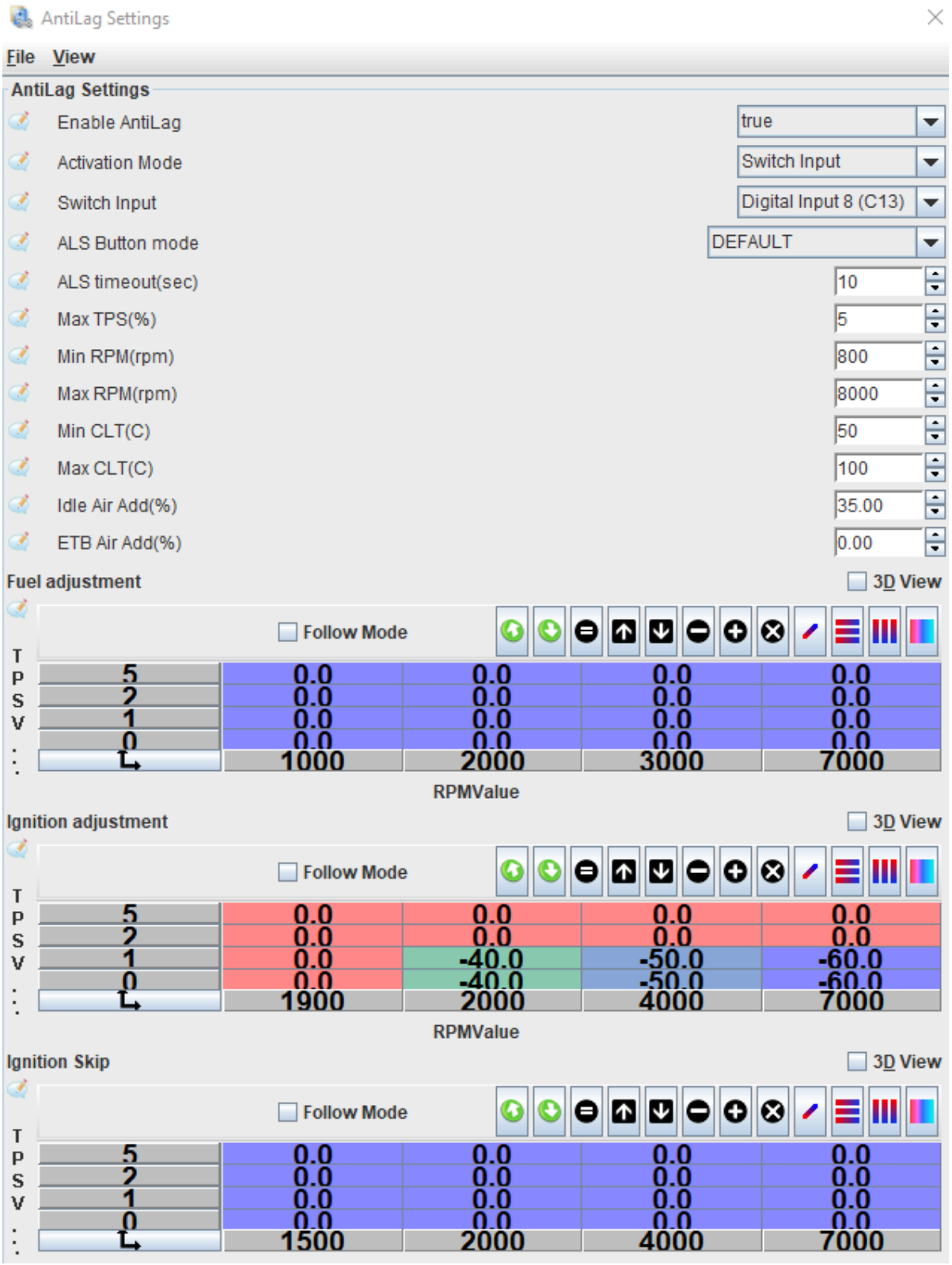


- **Launch RPM**: A secondary Rev limit engaged by the driver to help launch the vehicle faster.
- **Launch Control Window**: RPM deducted from Launch RPM, which starts to retard ignition timing.
- **Smooth Retard Mode**: Interpolates the Ignition Retard from 0 to 100% within the RPM Range.

14) Anti-lag

The ANTI-LAG is used to help decrease the lag of the… **I mean, spit flames, a lot of 🔥🔥🔥!**

14.1. Wire a switch that sends a ground signal to an unused Digital Input.

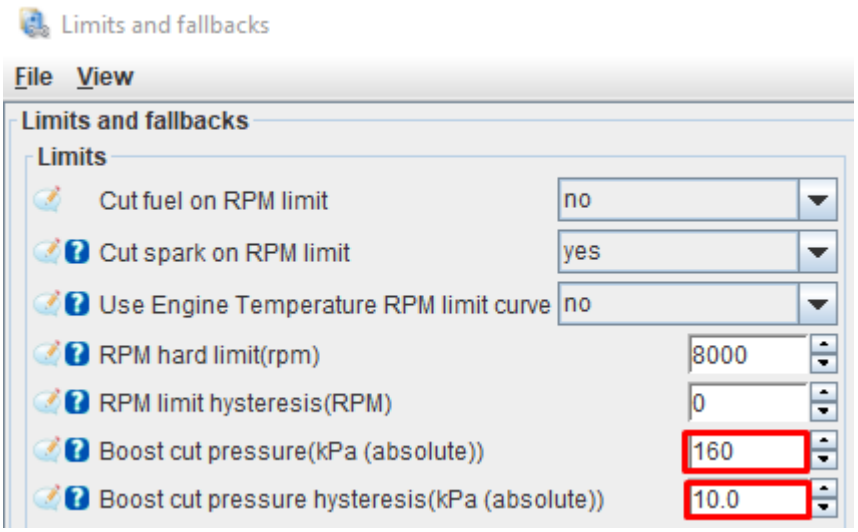


15) Boost control

A boost controller is a device used to increase the boost pressure produced by the turbocharger.

15.1. Connect the negative wire of the boost controller valve to an auxiliary low-side output.

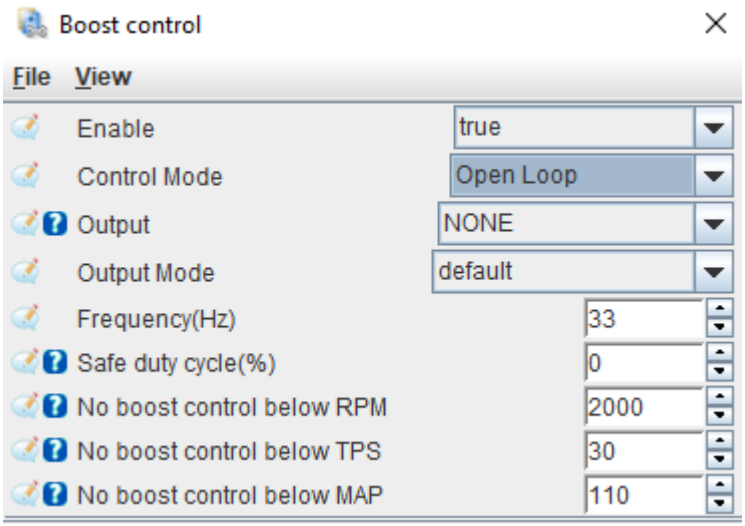
15.2. Activate a boost limit to protect the engine from overboost.



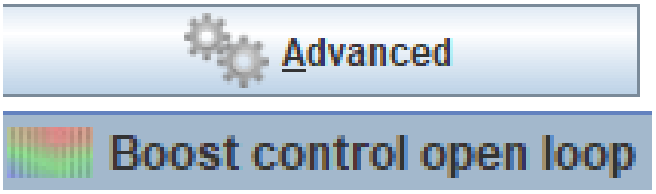
- **Boost cut pressure (absolute)**: MAP value above which fuel is cut in case of overboost.
- **Boost cut pressure hysteresis**: If hard cut is 160kpa, and boostCutPressureHyst is 10, when the ECU sees 160kpa, fuel/ign will cut, and stay cut until 160-10=150kpa is reached.
- **160kpa absolute** = 100 kpa atmosphere + 60 kpa of boost

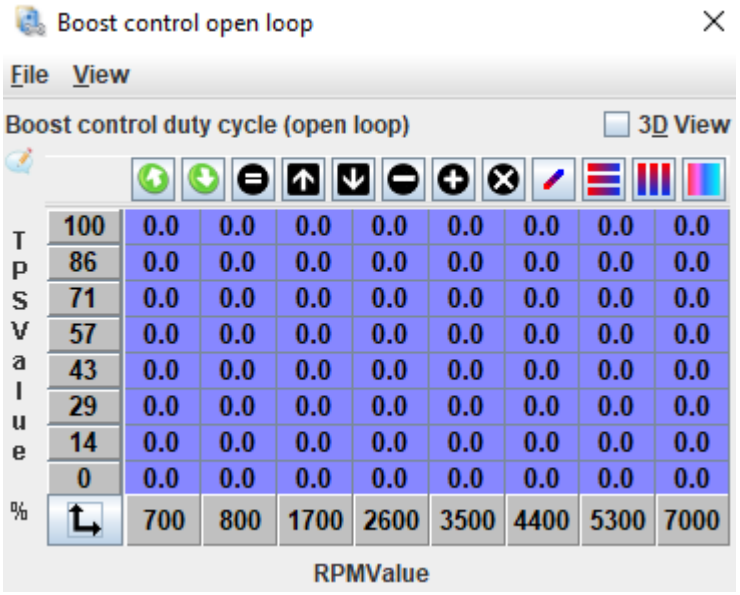
15.3. Select **Open-loop** mode and the auxiliary output.

Open-loop: Regulates the boost valve's duty cycle according to the percentage values in the control table.



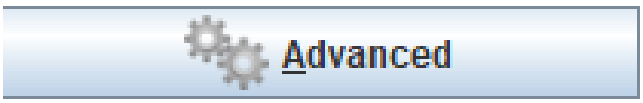
15.4. Configure the Boost control open-loop table.

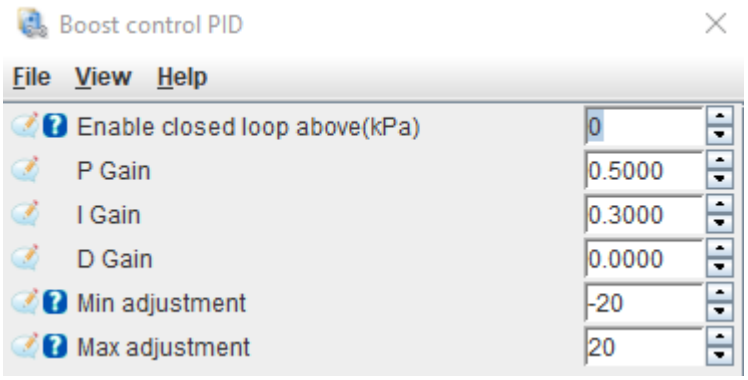


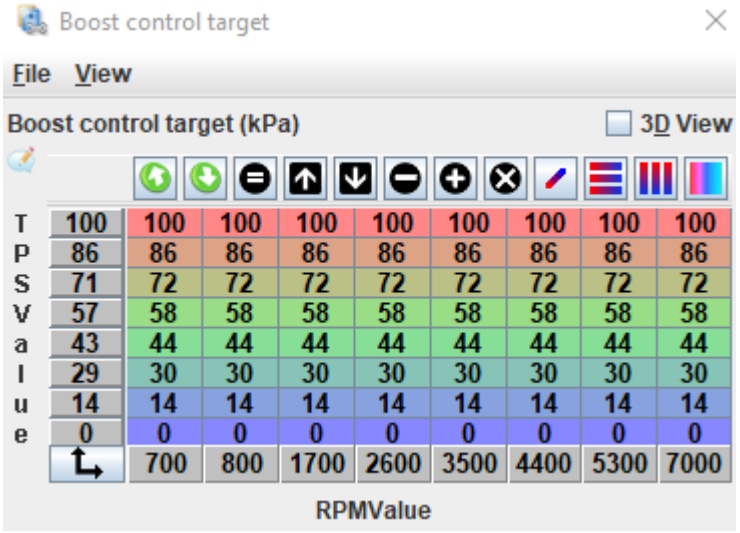


15.5. It’s possible to enable the **Open + Closed-loop** and control the boost more precisely.

Open + Closed-loop: Regulates the boost valve's duty cycle using the open-loop table, combined with a PID algorithm and a target table.

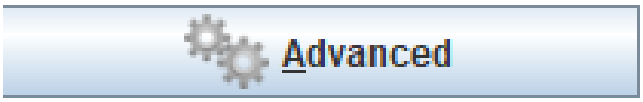


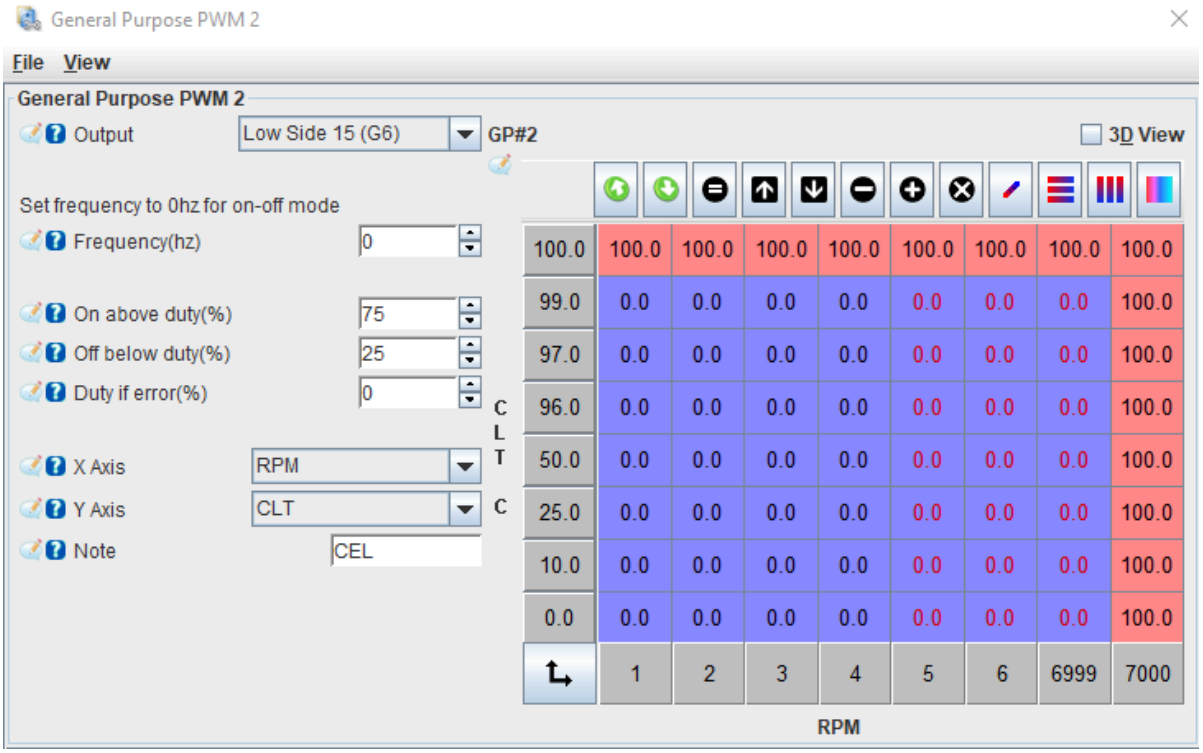




16) CEL: Shift / Warning light

The engine light can be used as a programmable output. I prefer to use it as a shift indicator and for coolant temperature warnings.



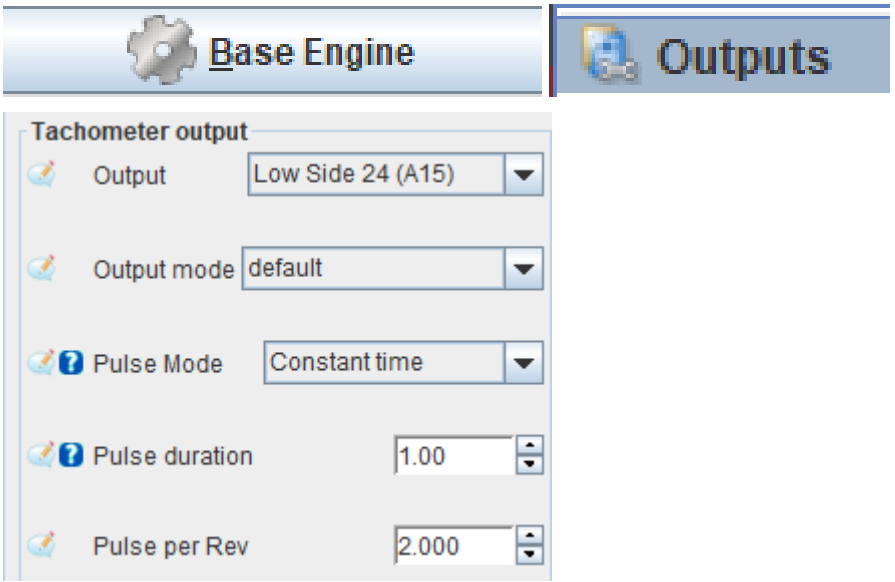


0 = OFF
100 = ON

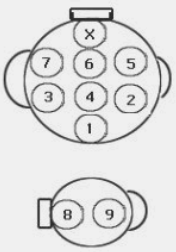
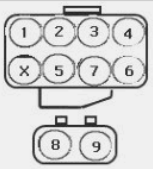
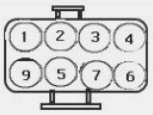
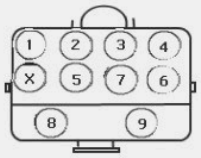
17) Tachometer

The ECU can control the tachometer. With a stock distributor, the signal is sent by the distributor coil. However, modifications are required if you switch to a coil-on-plug ignition or want the ECU to control the signal.

17.1. Select the Tachometer output to send the RPM signal.



17.2. Connect the Tachometer output to the speed output wire previously controlled by the distributor.

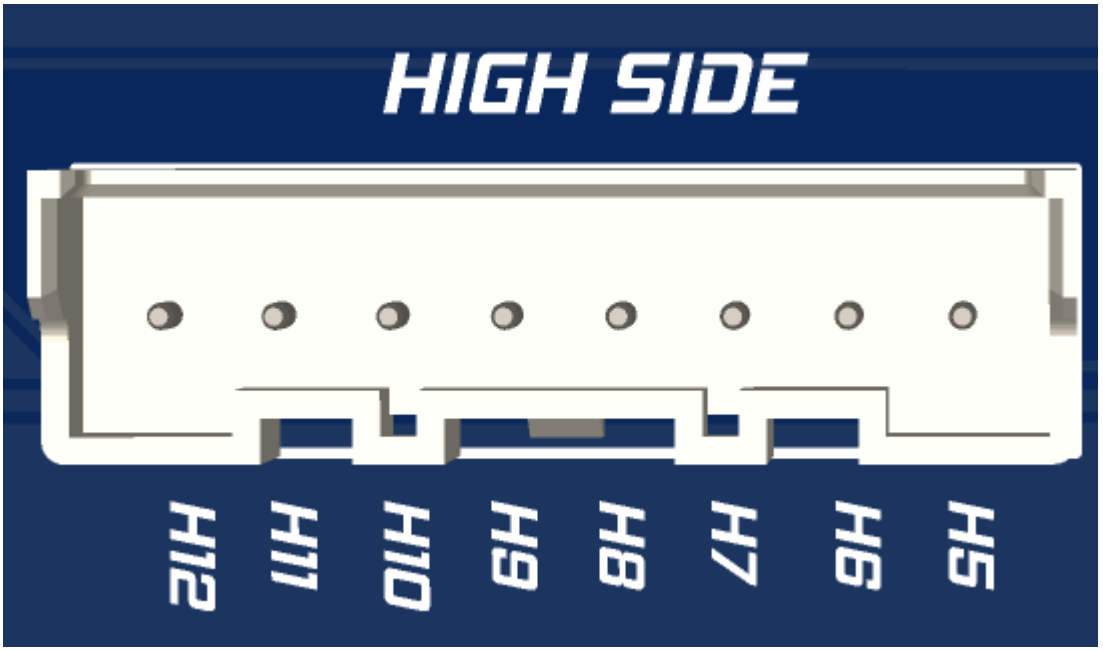
OBD/Model	Plug Type (all plugs are shown from wired side)	Wiring Color and Wire Function (Wire colors may vary pay attention more to the number positions)
OBD0 (except Civic DPFI Models) 1988- 1991		1. Large White (Ign input signal) 2. Orange (Crank position output) 3. Orange/Blue (TDC output) 4. Blue/Green (CYP output) 5. White(Crank position ground) 6. Blue/Yellow (CYP ground) 7. White/Blue (TDC ground) 8. Blue (Speed output) ← 9. Black/Yellow (Ign input)
OBD1 1992- 1995		1. Yellow/Green (Ign input signal) 2. Blue/Green (Crank position output) 3. Orange/Blue (TDC output) 4. Orange (CYP output) 5. Blue/Yellow or White (Crank position ground) 6. White or Black (CYP ground) 7. White/Blue or Red (TDC ground) 8. Blue (Engine speed output) ← 9. Blk/Yellow (Ign Input) X- blank spot
OBD2b Civic (except HX and Si) 1996+		1.Yellow/Green (Ign input signal) 2. Lt blue or blue (Crank position output) 3. Orange/Blue or Green (TDC output) 4. Orange or Yellow (CYP output) 5. White (Crank position ground) 6. Black (CYP ground) 7. White/Blue or Red (TDC ground) 9. Black/Yellow (Ign input)
OBD2a Civic OBD2b Civic Civic HX and Si OBD2a and OBD2b Integra	1996+ 	1. Yellow/Green(Ign input signal). 2. Blue/ Green (Crank Position output) 3. Orange/Blue (TDC output) 4. Orange (CYP output) 5. Blue/Yellow (Crank Position Ground) 6. White (CYP ground) 7. White/Blue (TDC ground) 8 Blue (Engine speed output) ← 9. Black/Yellow (Ign input) X- blank spot

18) Auxiliary inputs/outputs

NOTE1: If no sensor is wired, it can be repurposed for any other function.

LOW SIDE: Controls injectors, valves and relays using a ground signal.

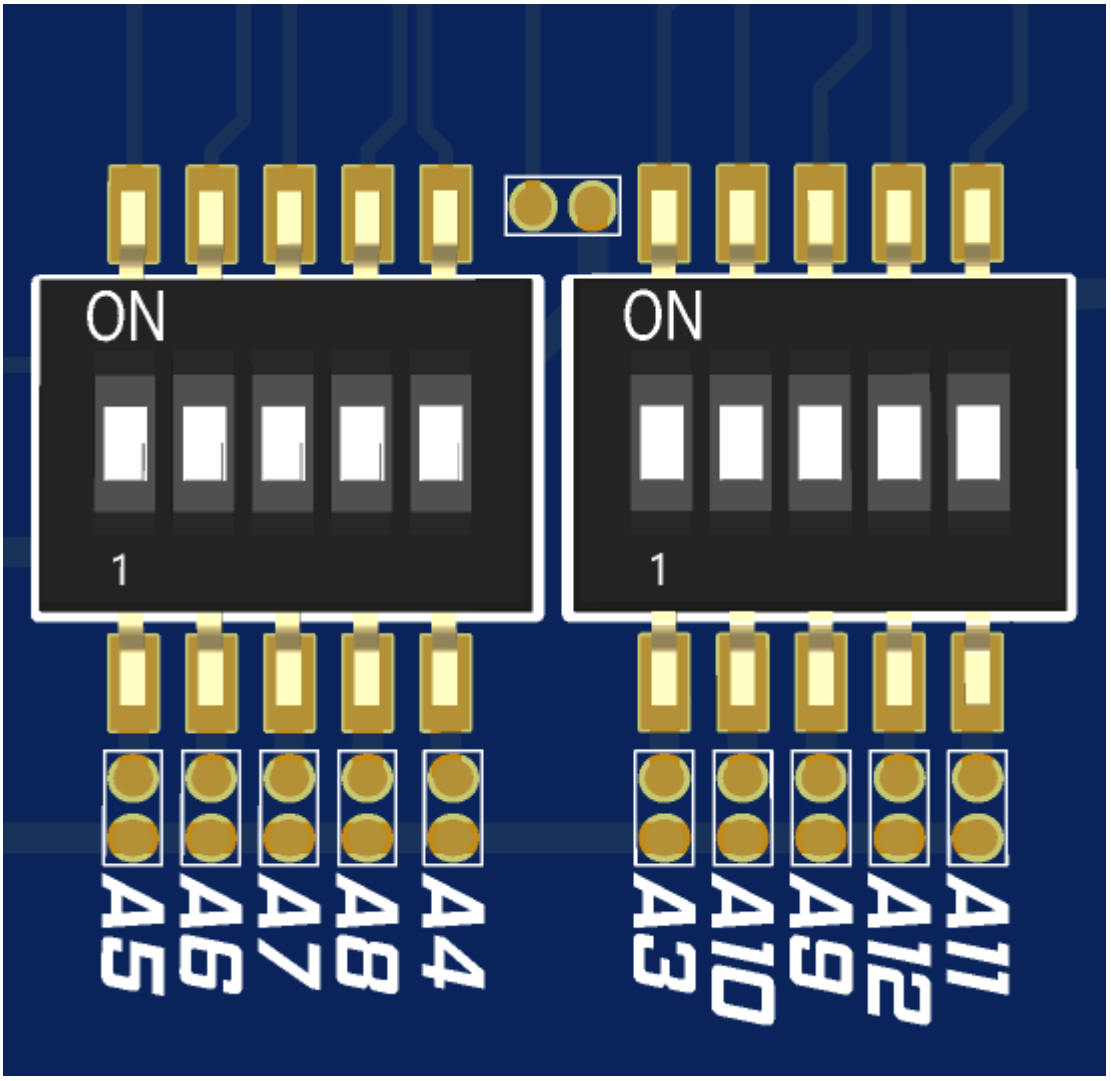
HIGH SIDE: Controls smart ignition coils with 5V or 12V signals.



- **H5 to H12:** Configurable for any auxiliary function

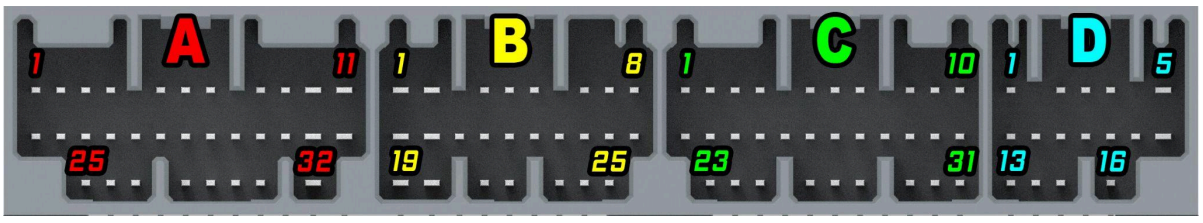
ANALOG: Inputs for sensors with a 0-5V output or for temperature sensors.

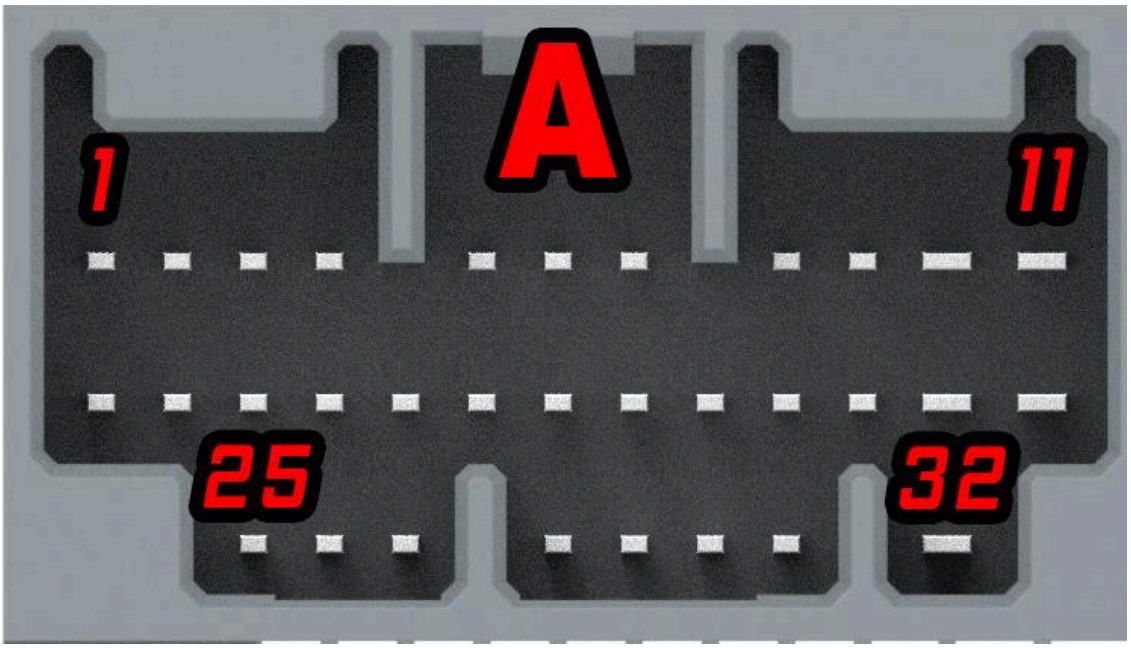
NOTE: To use temperature sensors, the corresponding input switch must be set to the ON position.



DIGITAL: Inputs for hall sensors (0-5V)

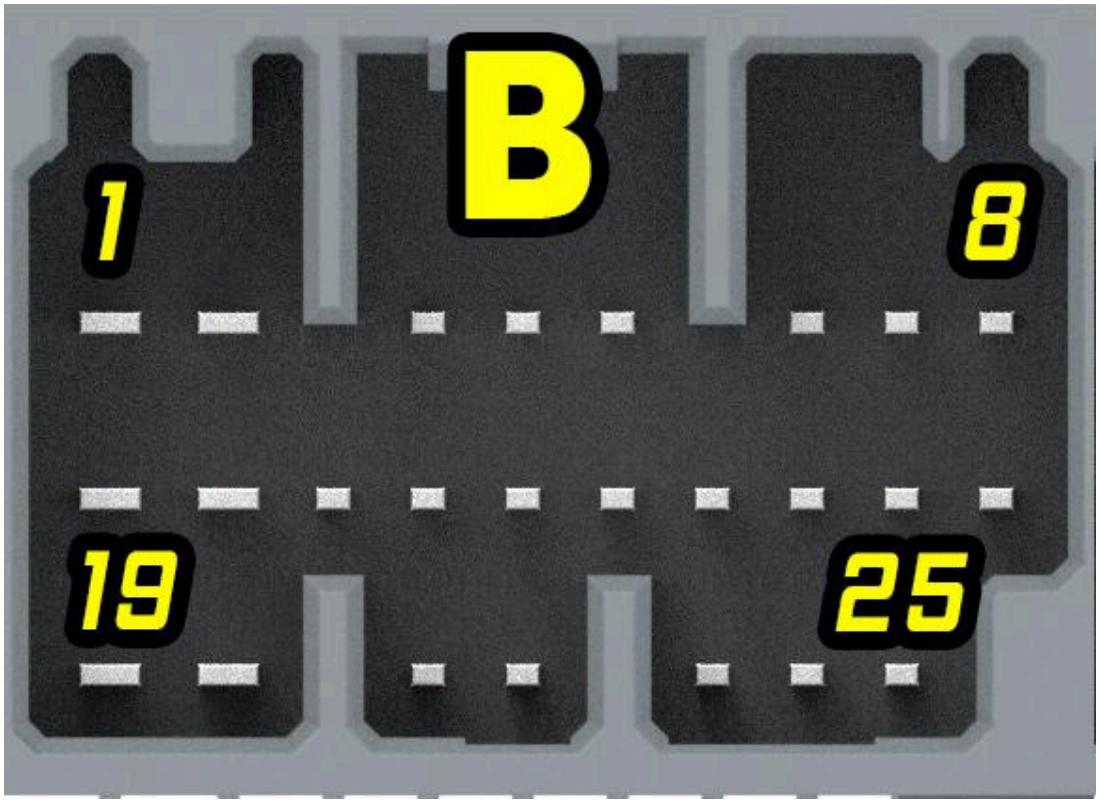
19) ECU PINOUT



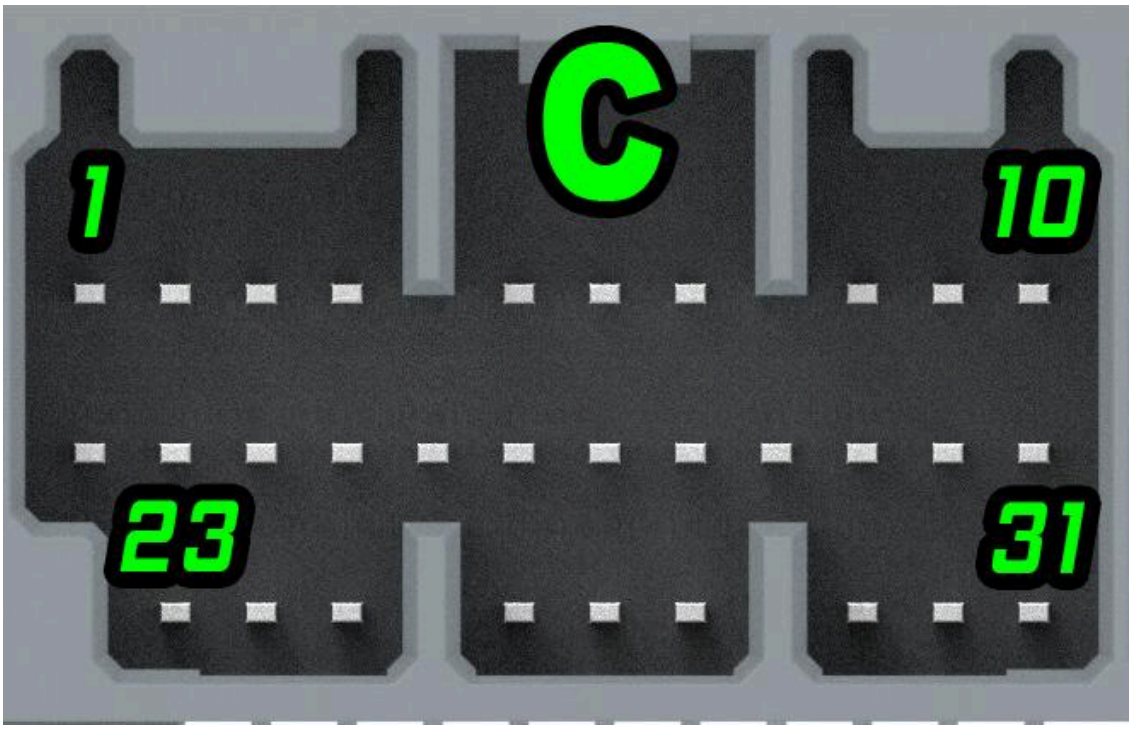


ECU Header	FUNCTION	TUNERSTUDIO
A1	Injector 4	Low Side 4
A2	Injector 3	Low Side 3
A3	Injector 2	Low Side 2
A4	Injector 1	Low Side 1
A5	Secondary O2 Heater Relay	Low Side 5
A6	Primary O2 Heater Relay	Low Side 6
A7	IAB - Intake Air Bypass (Integra)	Low Side 7
A8	VTEC A Solenoid	Low Side 8
A9	Ground	
A10	Ground	
A11	+12V Ignition	x
A12	Idle Valve (2 pin)	Low Side 9
A13	Idle Valve N (3 pin)	Low Side 10
A14	Idle Valve P (3 pin)	Low Side 11
A15	EVAP solenoid	Low Side 12
A16	Fuel Pump Relay	Low Side 13
A17	Air Conditioner - Clutch Relay	Low Side 14

A18	Check Engine Light	Low Side 15
A19	Alternator Control	Low Side 16
A20	ICM - Distributor Coil Signal	High Side 1
A21	VTEC B Solenoid	Low Side 17
A22	Ground	
A23	Ground	
A24	+12V Ignition	x
A25	x	x
A26	IAB - Intake Air Bypass (H22A4)	Low Side 18
A27	FAN Relay	Low Side 19
A28	2WBS	Low Side 20
A29	VSV	Low Side 21
A30	ECON Light	Low Side 22
A31	x	Low Side 23
A32	x	x

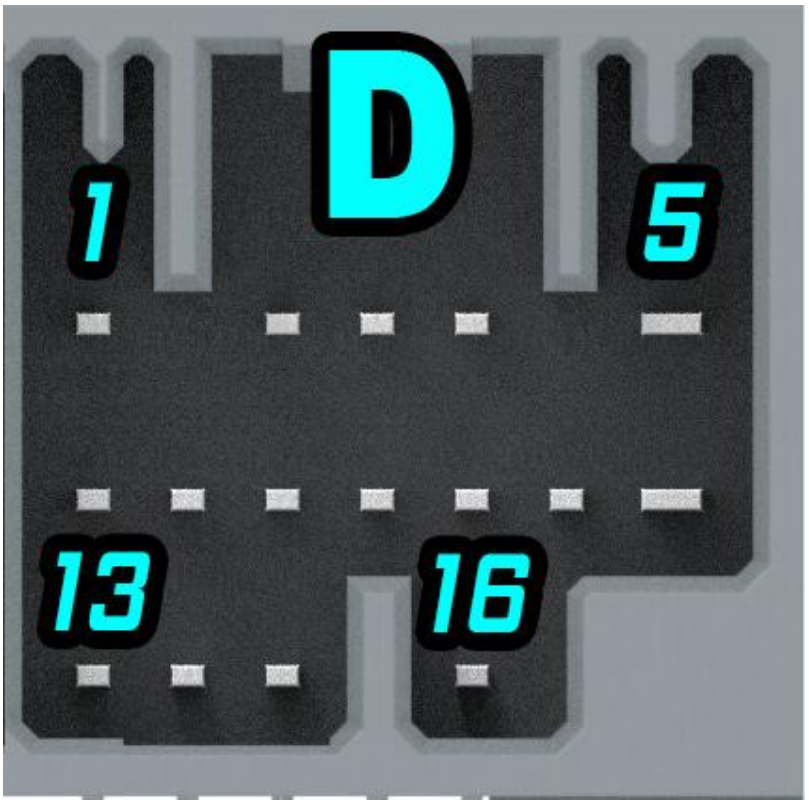


ECU Header	FUNCTION	TUNERSTUDIO
B1	Coil on Plug 1	High Side 1
B2	Coil on Plug 2	High Side 2
B3	Coil on Plug 3	High Side 3
B4	Coil on Plug 4	High Side 4
B5	Tachometer	Low Side 24
B6	x	Digital Input 6
B7	x	Digital Input 7
B8	x	Digital Input 8
B9	x	Analog Input 5
B10	x	Analog Input 8
B11	x	Analog Input 10
B12	x	Analog Input 11
B13	x	Analog Input 12
B14	+5V for Analog sensors	x
B15	+5V for Analog sensors	x
B16	+5V for Analog sensors	x
B17	GND for Analog sensors	x
B18	GND for Analog sensors	x
B19	GND for Analog sensors	x
B20	LSU 4.9 - PIN 5	x
B21	LSU 4.9 - PIN 6 (NERMEST)	x
B22	LSU 4.9 - PIN 1 (IP)	x
B23	LSU 4.9 - PIN 2 (VGND)	x
B24	LSU 4.9 - PIN 3 (HEATER-)	x
B25	LSU 4.9 - PIN 4 (HEATER+)	x



ECU Header	FUNCTION	TUNERSTUDIO
C1	CKF+	Trigger 3
C2	CKP+	Trigger 1
C3	x	x
C4	CYP+	Trigger 2
C5	Air Conditioner - Button Input	Digital Input 3
C6	x	x
C7	x	x
C8	x	x
C9	x	x
C10	x	x
C11	CKF-	Trigger 3
C12	CKP-	Trigger 1
C13	x	x
C14	CYP-	Trigger 2
C15	x	x

C16	Power Steering Switch	Digital Input 4
C17	x	x
C18	Vehicle Speed Sensor	Digital Input 1
C19	x	x
C20	Drive By Wire - Motor +	x
C21	x	x
C22	x	x
C23	x	x
C24	x	x
C25	x	x
C26	Drive By Wire - Motor -	x
C27	+5V for Analog sensors	x
C28	+5V for Analog sensors	x
C29	Clutch Switch	Digital Input 2
C30	Ground	
C31	Ground	



ECU Header	FUNCTION	TUNERSTUDIO
D1	Throttle Position Sensor	Analog Input 1
D2	Engine Coolant Temperature	Analog Input 2
D3	Manifold Pressure Absolute	Analog Input 4
D4	+5V for MAP	x
D5	Brake Switch	Digital Input 5
D6	Knock	Digital Input 9
D7	Primary O2 Signal	Analog Input 6
D8	Intake Air Temperature	Analog Input 3
D9	x	x
D10	+5V for TPS	x
D11	Ground for TPS	
D12	Ground for MAP	
D13	Ground	
D14	Secondary O2 Signal	Analog Input 7

D15	x	x
D16	x	x