

BOSS GARAGE

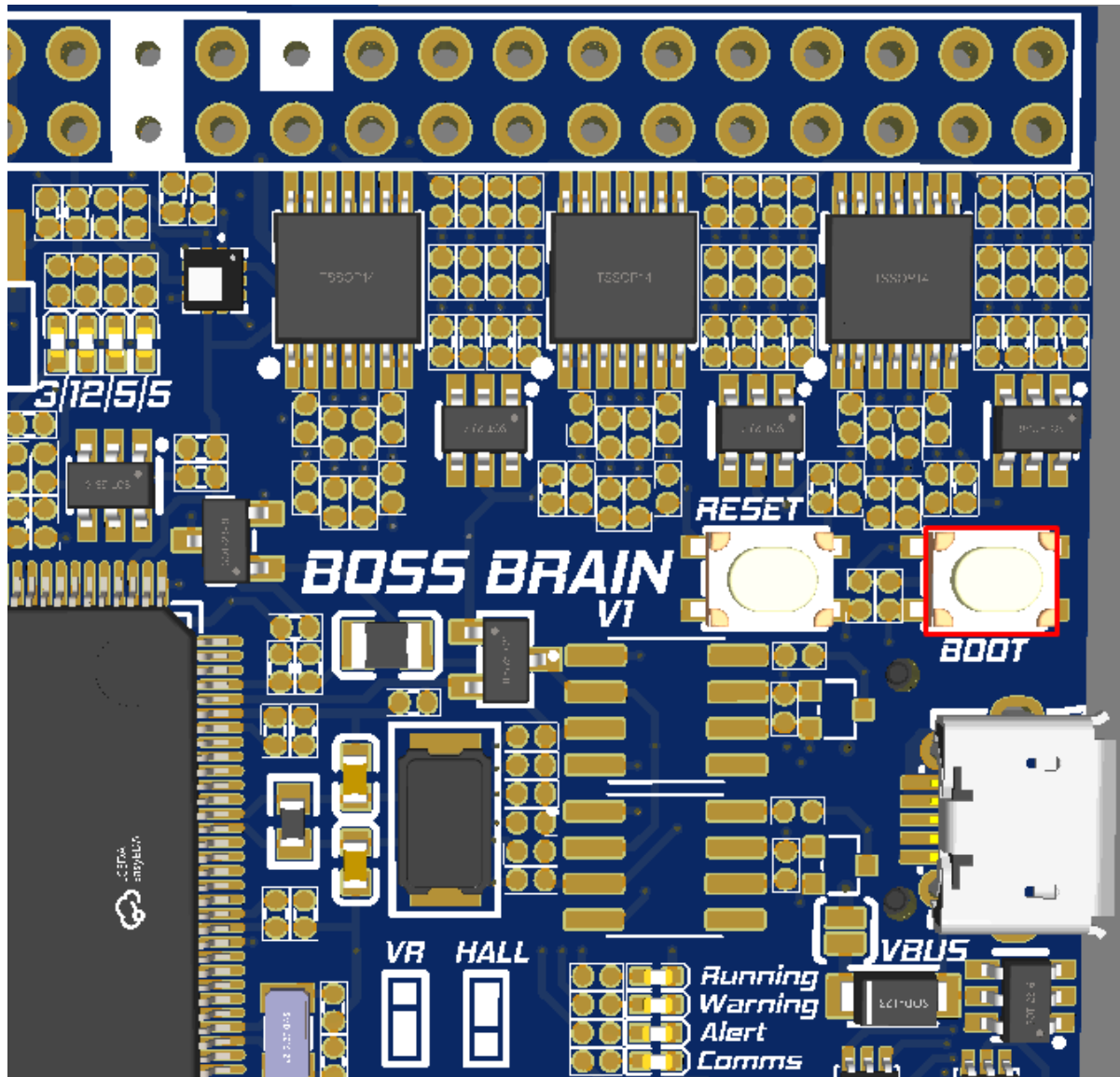
Honduino OBD2A - V1

Before connecting the ECU to the car

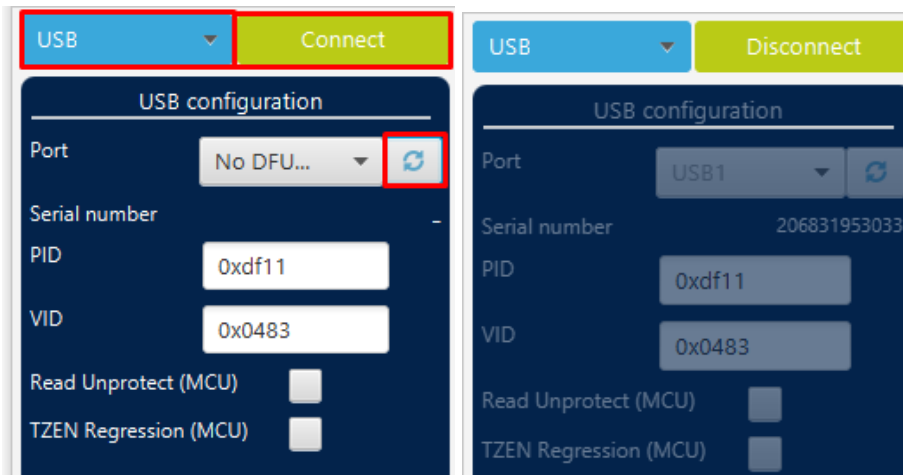
Before installing the ECU into the vehicle some pre-installation configuration must be performed.

1) Update the firmware (optional)

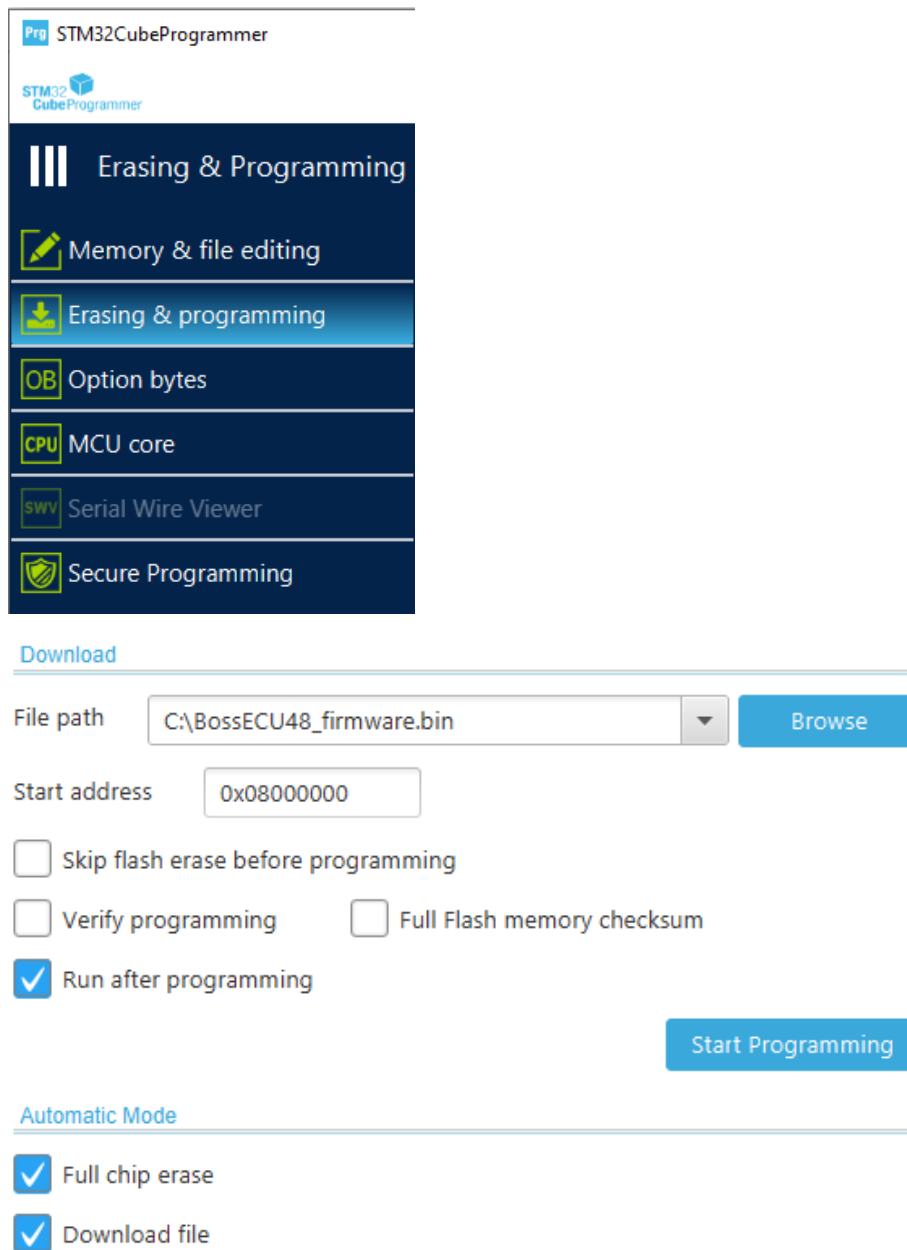
- 1.1. Download and install [STM32CubeProgrammer V2.14](#)
- 1.2. Download the latest FIRMWARE
- 1.3. Click on the **BOOT** button on the board and plug the USB cable into the computer



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




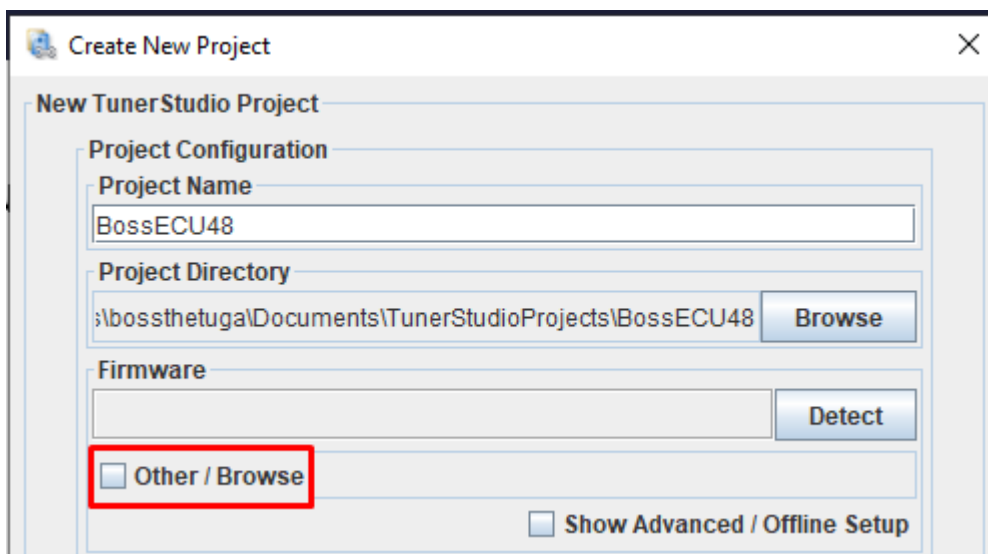
1.5. Go to the “Erasing & programming” menu, browse, and select the firmware.



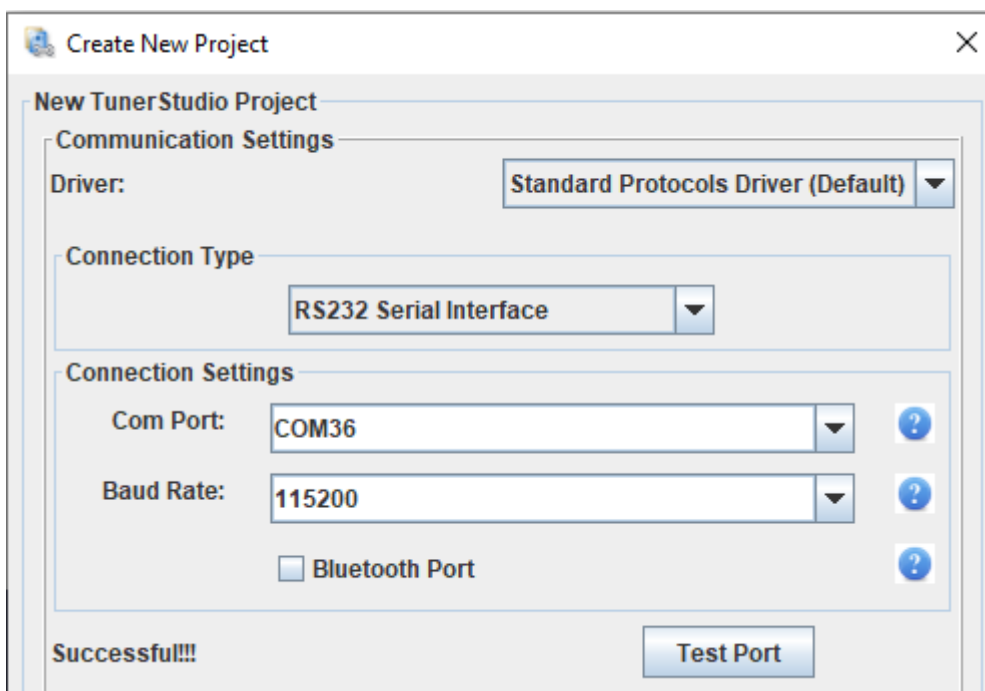
- 1.6. Insert the start address: 0x0800000
- 1.7. Select the boxes: "Run after programming", "Full chip erase" and "Download file"
- 1.8. Click "Start Programming"
- 1.9. You successfully updated the firmware! Now, close all the STM32CubeProgrammer windows and restart the ECU by clicking the RESET button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

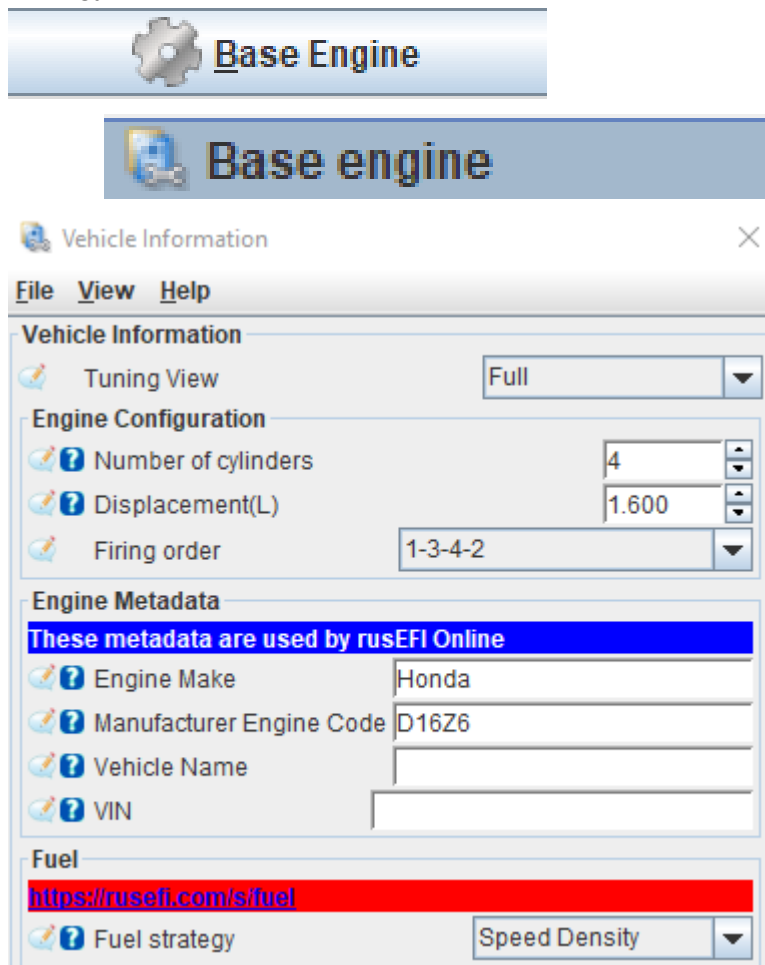


- 2.4. Use RS232 Serial for USB connection or Bluetooth direct



3.1) Base settings

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

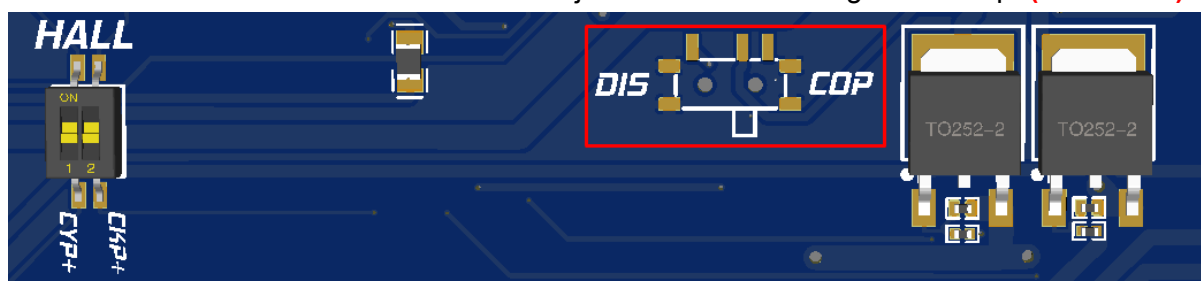


3.2) Ignition (Distributor / COP)

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.



Ignition settings

File View

Enabled ☐ true

Mode ☐ Single Coil

Spark hardware latency correction(uS)

Individually wired Wasted Spark ☐ true

Override ignition table load axis ☐ None

Use fixed timing while validating with a timing gun

Timing Mode ☐ dynamic

Fixed Timing(deg)

Ignition Outputs

wire each output to the corresponding cylinder number
ruSEFI handles firing order

Ignition Output Mode	default inverted
Ignition Output 1	High Side 1 (E15)
Ignition Output 2	High Side 2 (E14)
Ignition Output 3	High Side 3 (E13)
Ignition Output 4	High Side 4 (E12)
Ignition Output 5	NONE
Ignition Output 6	NONE
Ignition Output 7	NONE
Ignition Output 8	NONE
Ignition Output 9	NONE
Ignition Output 10	NONE
Ignition Output 11	NONE
Ignition Output 12	NONE

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

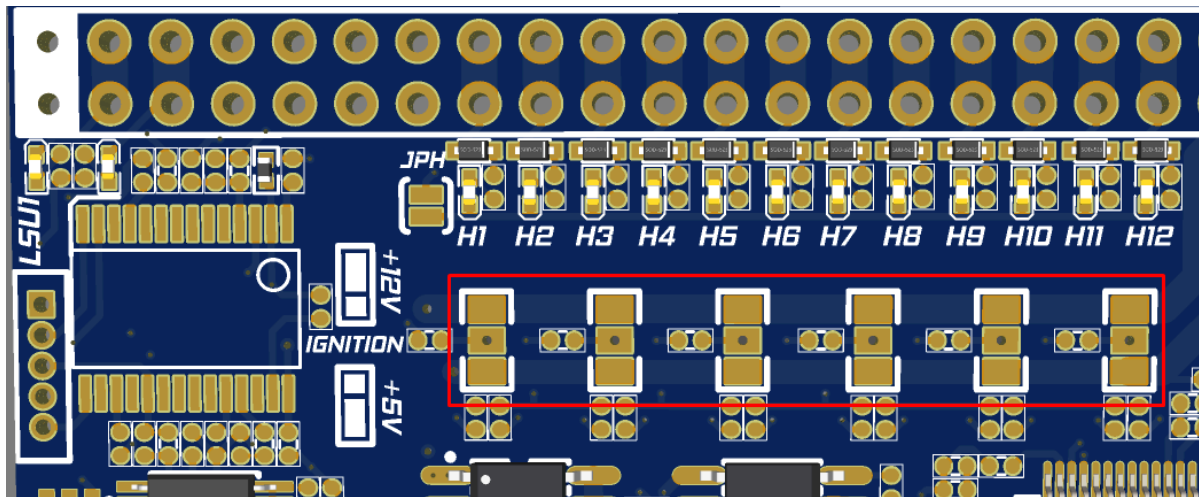
H3 + H4

H5 + H6

H7 + H8

H9 + H10

H11 + H12



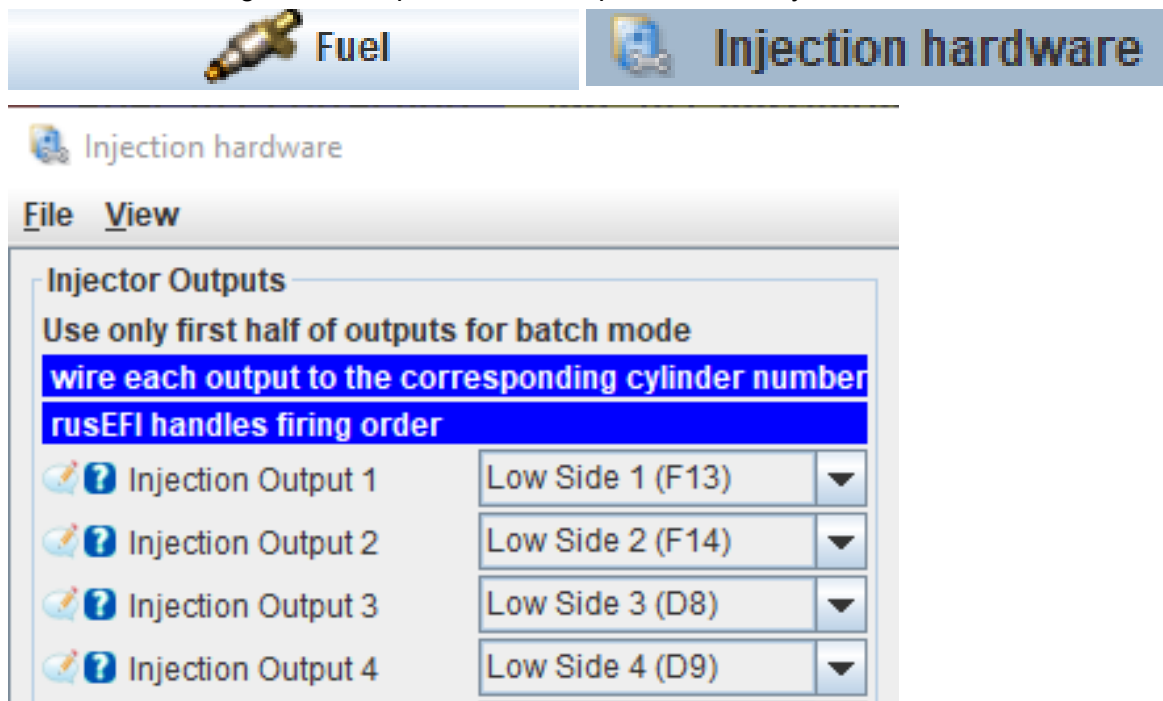
- Honda distributor: 12V
- Most of the smart coils: 5V

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



Injection configuration

Injection configuration

File View Help

Injection

Enabled ☐ true

Mode ☐ Sequential

Batch injection with individual wiring

Alpha-N uses IAT density correction ☐ false

Override VE table load axis ☐ None

Override AFR table load axis ☐ None

Injection phase control mode ☐ End of injection

Injector Settings

Injector flow ☐ 240.00

Injector flow units ☐ cc/min

Fuel rail pressure sensor ☐ Low

Injector flow compensation mode ☐ None

Injector reference pressure(kPa) ☐ 294

Fuel characteristics

Stoichiometric ratio(:1) ☐ 14.7

E100 stoichiometric ratio(:1) ☐ 9.0

Injector dead time ☐ 3D View

☐ Follow Mode

350.00	3.00	2.05	1.09	0.62	0.55	0.47	0.40	0.33					
300.00	3.00	2.05	1.09	0.62	0.55	0.47	0.40	0.33					
↶	6.00	8.00	9.92	12.04	13.00	14.16	15.00	16.00					

Battery

3.4) Temperature sensors

3.4.1 Coolant temperature sensor



CLT Sensor

CLT sensor

Input channel: Analog Inputs 2 (A2)

Pullup resistor(Ohm): 2490.0

Common CLT Sensors: Custom

**Input three pairs of thermistor temperature and resistance.
Typical temperatures are -40 deg C, 0 deg C and 100 deg C**

Lowest temperature(*C): -40.0

Resistance @ LT(Ohm): 100490.0


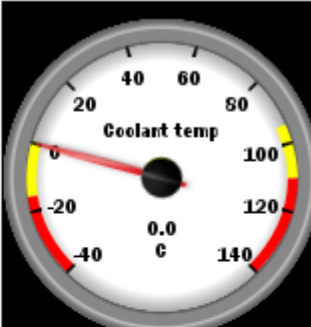
Middle temperature(*C): 30.0

Resistance @ MT(Ohm): 1875.0

Highest temperature(*C): 99.0

Resistance @ HT(Ohm): 125.0

Linear characteristic: false



The figure shows two gauges. The top gauge is labeled "Coolant temp" and has a scale from -40 to 140 degrees Celsius. The needle is pointing to approximately -10 degrees Celsius. The bottom gauge is labeled "Raw CLT" and has a scale from 0 to 5 Volts. The needle is pointing to approximately 0.5 Volts.

3.4.2 Intake temperature sensor



IAT Sensor

IAT sensor

Input channel: Analog Inputs 3 (A3)

Pullup resistor(Ohm): 2490.0

Common IAT Sensors: Custom

**Input three pairs of thermistor temperature and resistance.
Typical temperatures are -40 deg C, 0 deg C and 100 deg C**

Lowest temperature(*C): -40.0

Resistance @ LT(Ohm): 100490.0

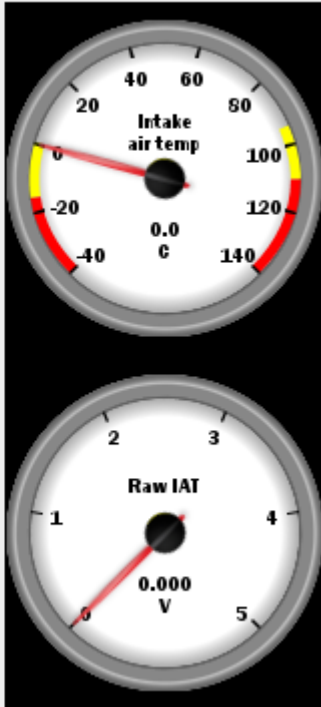
Middle temperature(*C): 30.0

Resistance @ MT(Ohm): 1875.0

Highest temperature(*C): 99.0

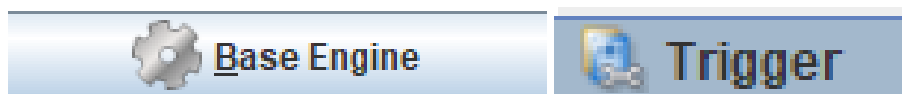
Resistance @ HT(Ohm): 125.0

Linear characteristic: false



3.5) Trigger wheel

3.5.1 Configure the trigger wheel according to your distributor:



Trigger

File View Help

Primary Trigger

Strokes: Four Stroke

Trigger type: 12crank/24cam

Reminder that 4-stroke cycle is 720 degrees

For well-known trigger types use '0' trigger angle offset

Trigger Angle Advance(deg bt/dc): 100

Cam is primary if you have cam sensor as part of trigger shape

Crank Sensor (Primary channel): Trigger 1 (E2)

Primary Edge: Rising

Secondary channel: NONE

Secondary Edge: Rising

Cam Inputs

<https://ruseff.com/s/vvt>

Cam mode (intake): Single Tooth

Cam mode (exhaust): Inactive

Cam sensor bank 1 intake: Trigger 2 (E3)

Cam sensor bank 1 exhaust: NONE

Cam sensor bank 2 intake: NONE

Cam sensor bank 2 exhaust: NONE

intake Cam Edge Select: Rising

exhaust Cam Edge Select: Rising

Set offset so VVT indicates 0 degrees in default position

VVT offset bank 1 intake(value): 0.0

VVT offset bank 1 exhaust(value): 0.0

VVT offset bank 2 intake(value): 0.0

VVT offset bank 2 exhaust(value): 0.0

Cam for engine sync resolution: Intake First Bank

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

Sensors

TPS

TPS

File
View

TPS Limits

TPS minimum valid value(%)

-10

TPS maximum valid value(%)

110

Throttle Body #1

Primary sensor

Analog Inputs 1 (A1)

Primary min(ADC)

95

Primary max(ADC)

910

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.

Sensors

MAP sensor

MAP common settings

Low value threshold(kPa) 5.00

High value threshold(kPa) 190.00

Measure Map Only In One Cylinder false

Cylinder count to sample MAP(count) 1

MAP sensor

MAP input Analog Inputs 4 (A4)

MAP type DENSO183

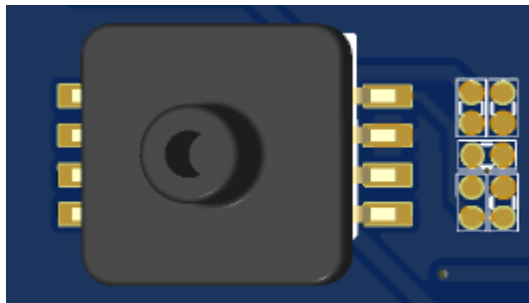
MAP value low point(kpa) 0.00

MAP voltage low point(v) 0.00

MAP value high point(kpa) 0.00

MAP voltage high value(v) 5.00

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.

Base Engine **Outputs**

Fan Settings

Fan 1

Output Low Side 19 (C7)

Output mode default

On temperature(deg C) 89

Off temperature(deg C) 86

Enable with AC true

Disable when engine stopped true

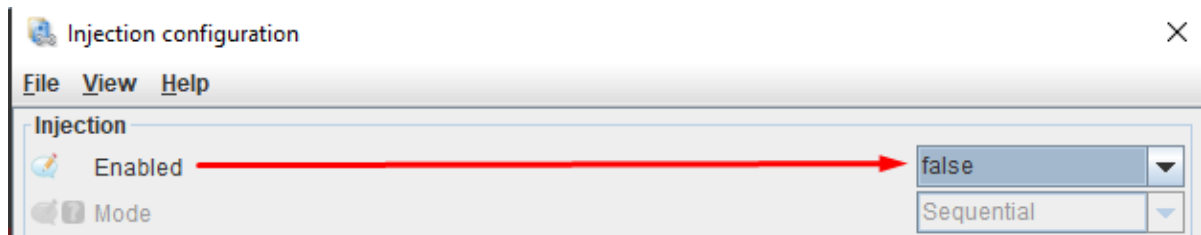
Disable above vehicle speed 0

Idle adder(%) 1

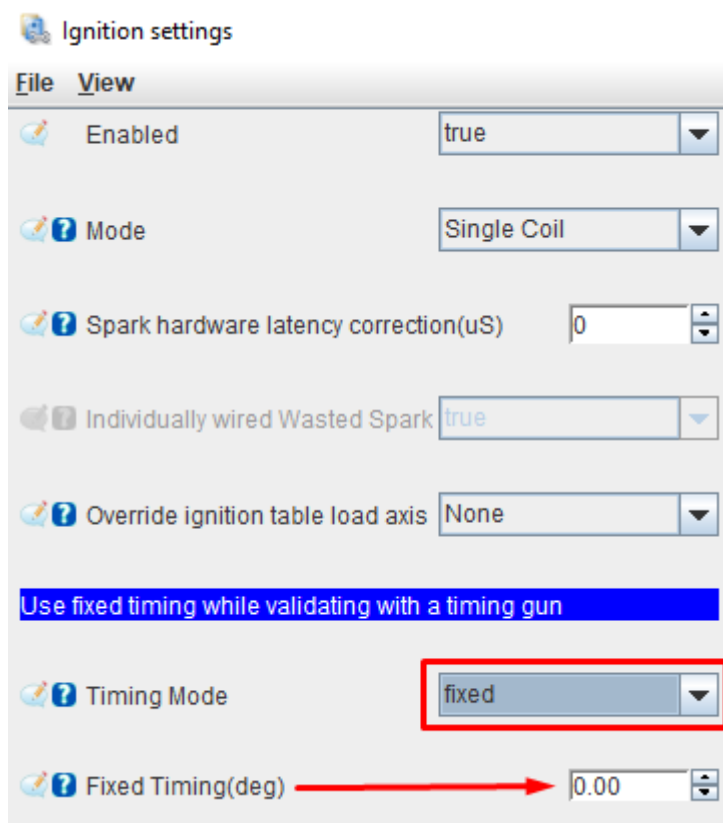
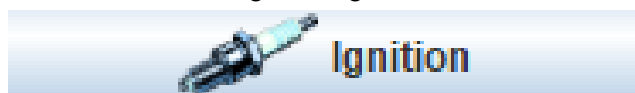
7) Ignition base timing (same as the rotation of the distributor)

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)

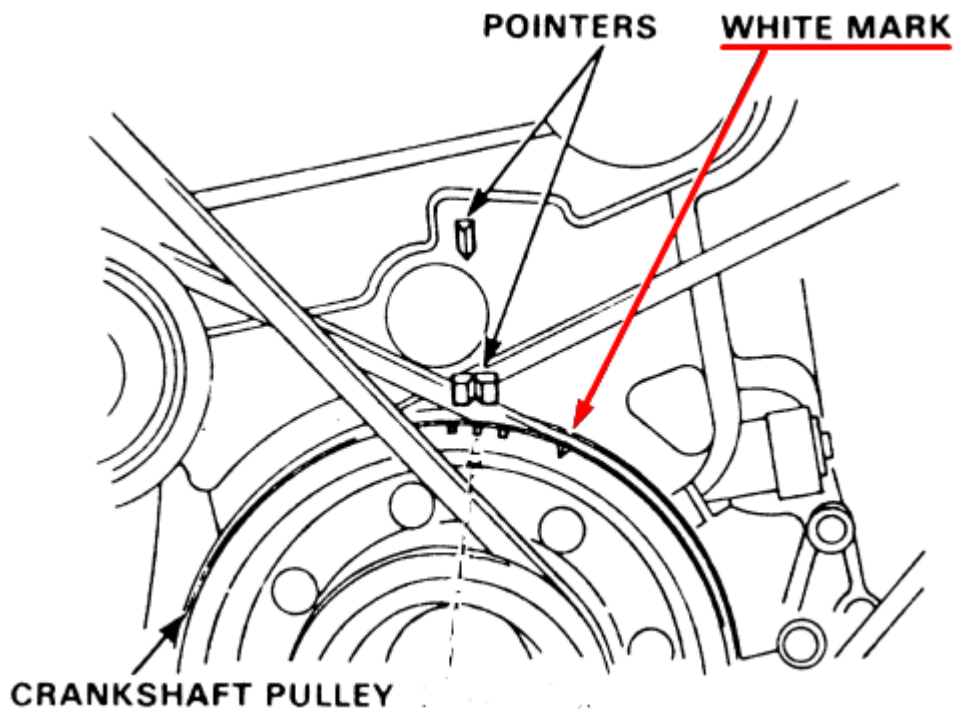


7.2. Change the timing mode from **dynamic** to **fixed**, so the ECU fires the coil always on the 0-degree angle.



- 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.



Base Engine



Trigger

Trigger

File View Help

Primary Trigger

Strokes: Four Stroke

Trigger type: 12crank/24cam

Reminder that 4-stroke cycle is 720 degrees

For well-known trigger types use '0' trigger angle offset

Trigger Angle Advance(deg btdc): 105

Cam is primary if you have cam sensor as part of trigger shape

Crank Sensor (Primary channel): Trigger 1 (E2)

Primary Edge: Rising

Secondary channel: NONE

Secondary Edge: Rising

Cam Inputs

<https://rusefi.com/s/vvt>

Cam mode (intake): Single Tooth

Cam mode (exhaust): Inactive

Cam sensor bank 1 intake: Trigger 2 (E3)

Cam sensor bank 1 exhaust: NONE

Cam sensor bank 2 intake: NONE

Cam sensor bank 2 exhaust: NONE

intake Cam Edge Select: Rising

exhaust Cam Edge Select: Rising

Set offset so VVT indicates 0 degrees in default position

VVT offset bank 1 intake(value): 0.0

VVT offset bank 1 exhaust(value): 0.0

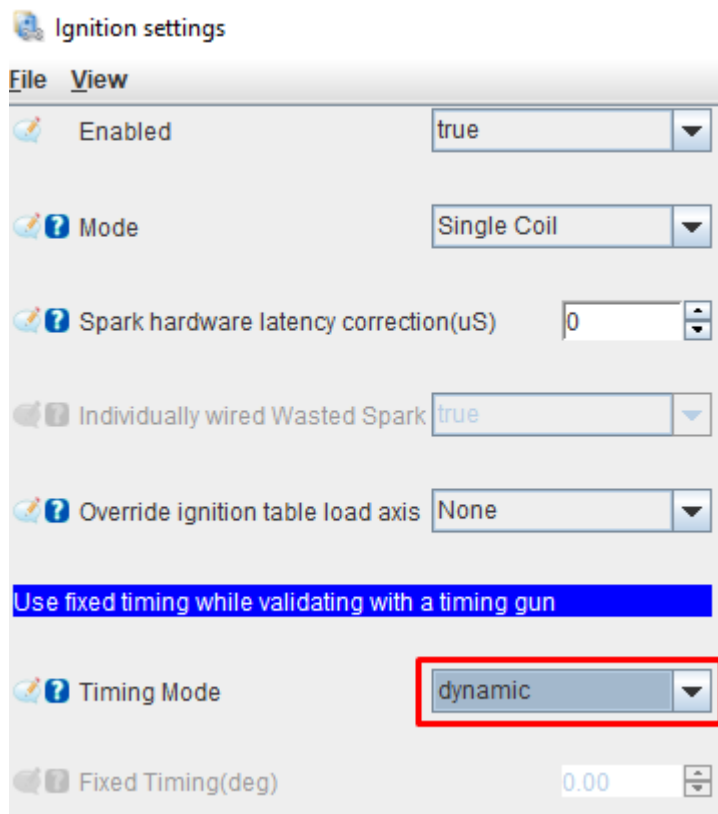
VVT offset bank 2 intake(value): 0.0

VVT offset bank 2 exhaust(value): 0.0

Cam for engine sync resolution: Intake First Bank

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



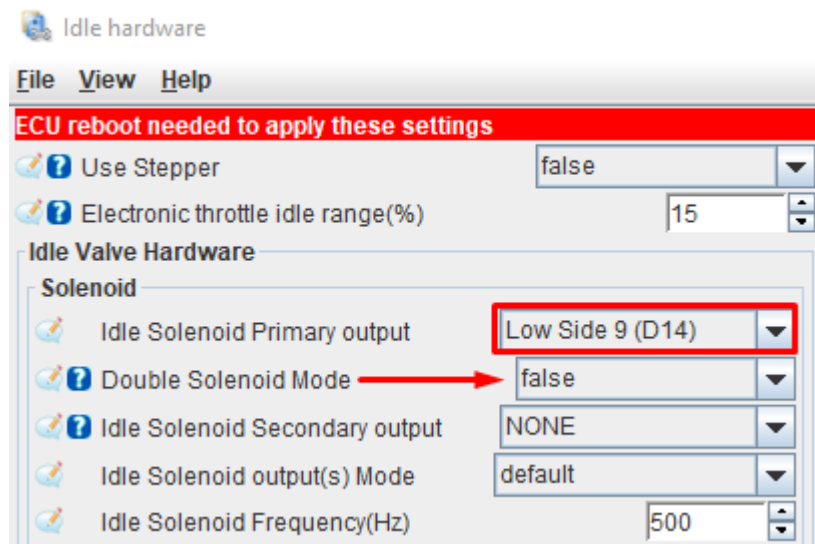


7.7. The timing is synced, now start your car 🎉🎉🎉

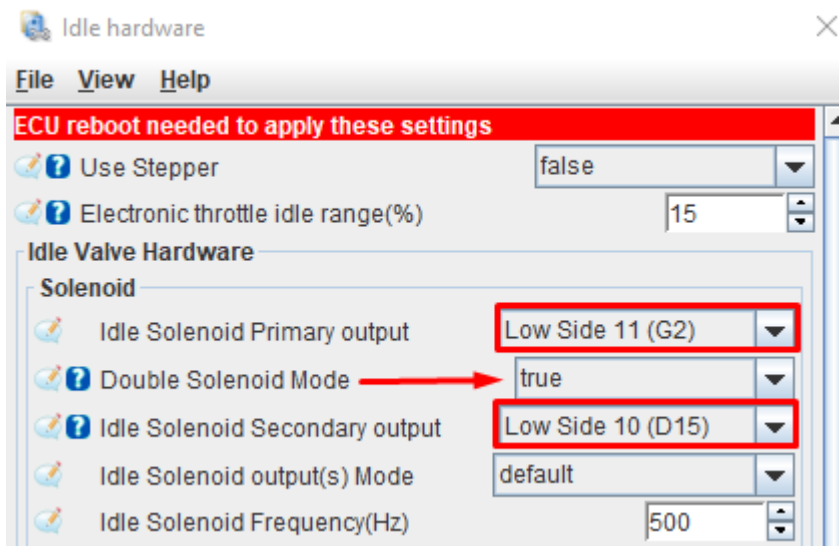
8) Idle control

8.1. Configure between 2 or 3 wire Idle Valve.

2 wire Idle Valve (D16Y8)

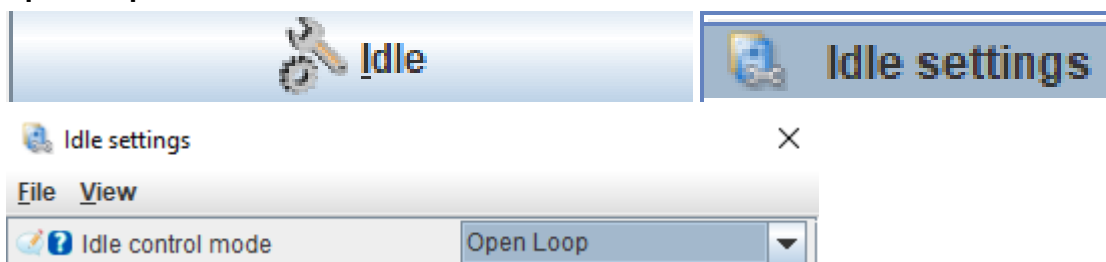


3 wire Idle Valve (D14Z4)



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

Open loop idle control mode:

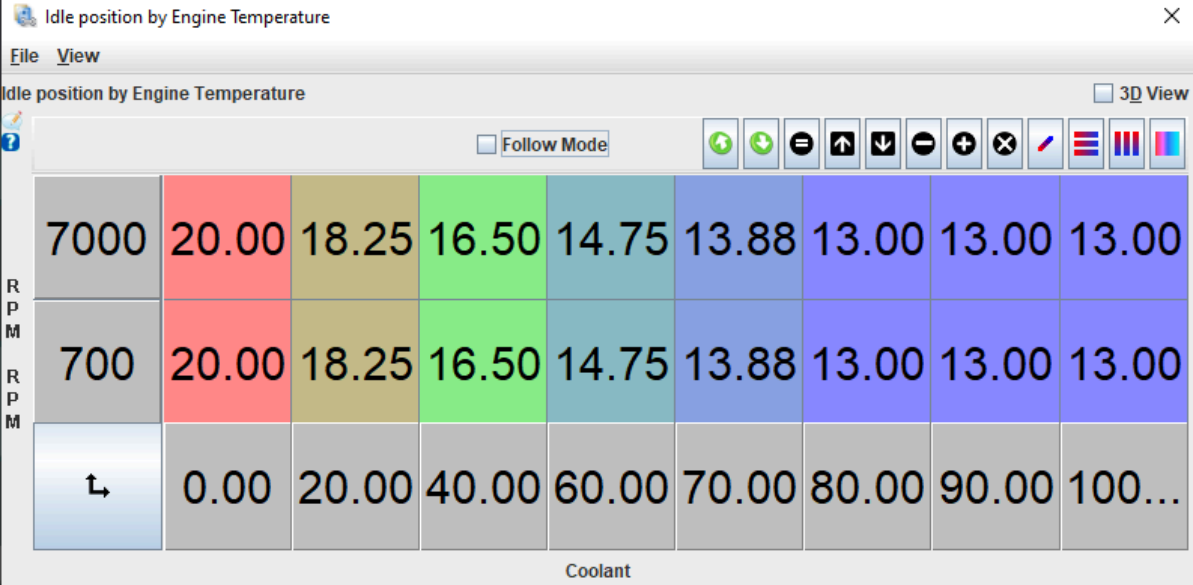


Disabled closed loop Idle timing:

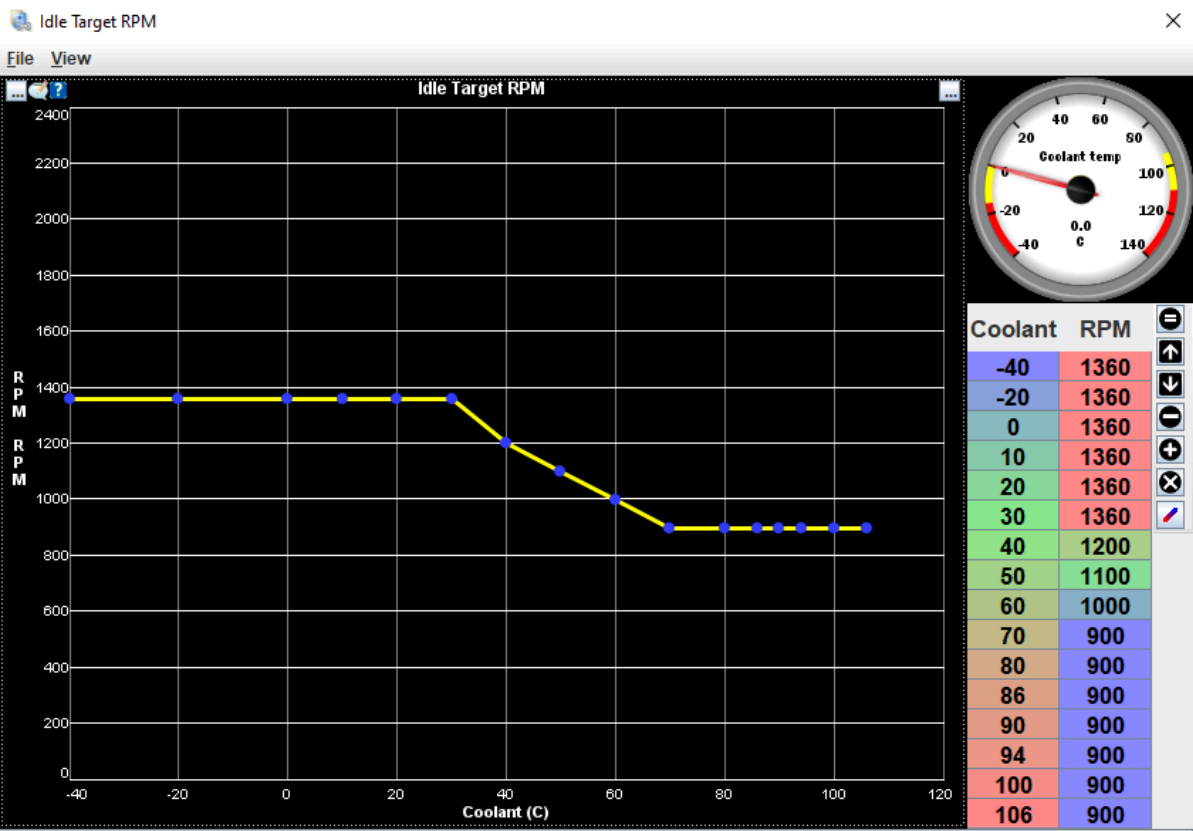


8.3. Adjust the open loop idle table





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



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



Idle settings

File View

Idle control mode: Open Loop + Closed Loop

Closed Loop Idle

P-factor	0.8000
I-factor	0.4000
D-factor	0.1000
Min	-2
Max	5
iTerm Min	-10
iTerm Max	10
PID Extra for low RPM(%)	5
Use IAC PID Multiplier Table	false

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



Closed-loop idle timing

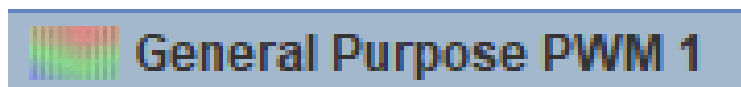
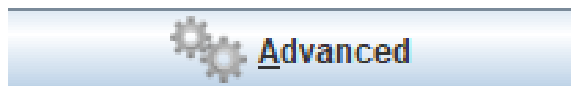
File View

Enable closed loop idle ignition timing: true

Gain is in degrees advance per rpm away from target
A good starting point is 0.1 = 10 deg per 100 rpm

Proportional gain	0.2000
Integral gain	0.0000
Derivative gain	0.0000
Min adjustment (retard)	-4
Max adjustment (advance)	4
Soft entry time	1.0

9) VTEC solenoid



General Purpose PWM 1

File View

General Purpose PWM 1

Output: Low Side 8 (D13) GP#1

Set frequency to 0hz for on-off mode

Frequency(hz): 0

On above duty(%): 75

Off below duty(%): 25

Duty if error(%): 0

X Axis: RPM

Y Axis: TPS

Note: VTEC

Follow Mode

100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
90.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
80.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
70.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
1	2	3	4	5	6	4999	5000	

RPM

0 = OFF

100 = ON

10) Vehicle Speed Sensor



Speed sensor

File View

Speed sensor

Input: Digital Input 1 (F5)

Filter parameter: 7

Wheel revolutions per kilometer(revs/km): 850.0

Speed sensor gear ratio: 1.000

Speed sensor tooth count: 4

CAN Vehicle Speed

Enable CAN VSS: false

CAN VSS type: BMW_e46

CAN VSS scaling(ratio): 1.0000

Gear Detection

Wheel revolutions per kilometer(revs/km): 850.0

Final drive ratio: 4.25

Forward gear count: 5

1st gear(ratio): 3.25

2nd gear(ratio): 1.91

3rd gear(ratio): 1.25

4th gear(ratio): 0.91

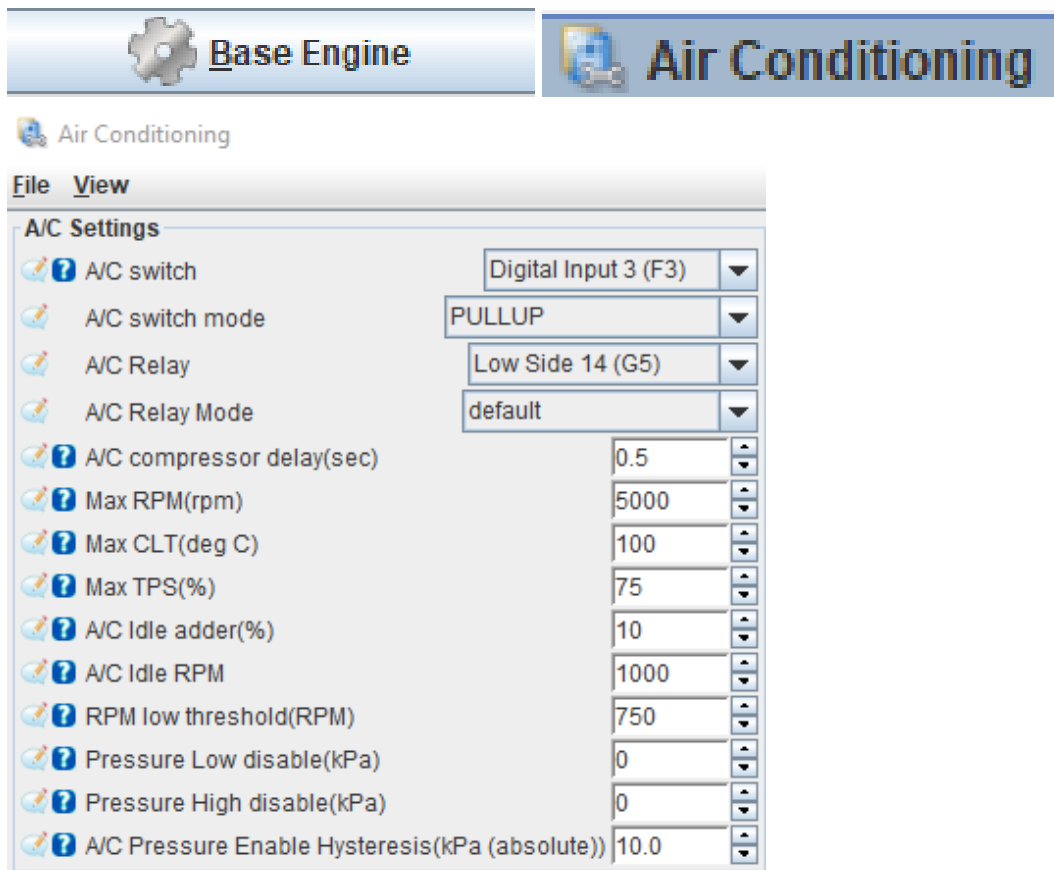
5th gear(ratio): 0.70

6th gear(ratio): 0.00

7th gear(ratio): 0.00

8th gear(ratio): 0.00

11) Air Conditioner

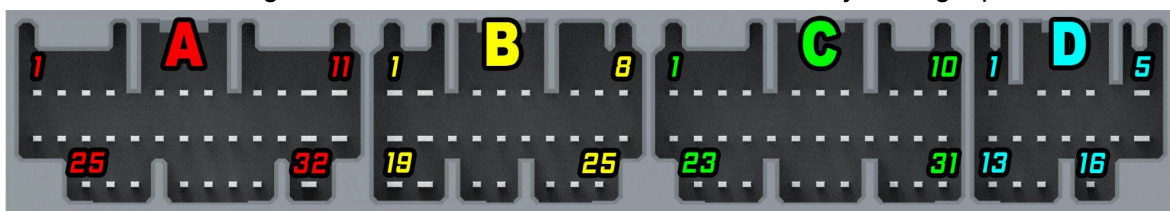


Extra features

12) Wideband

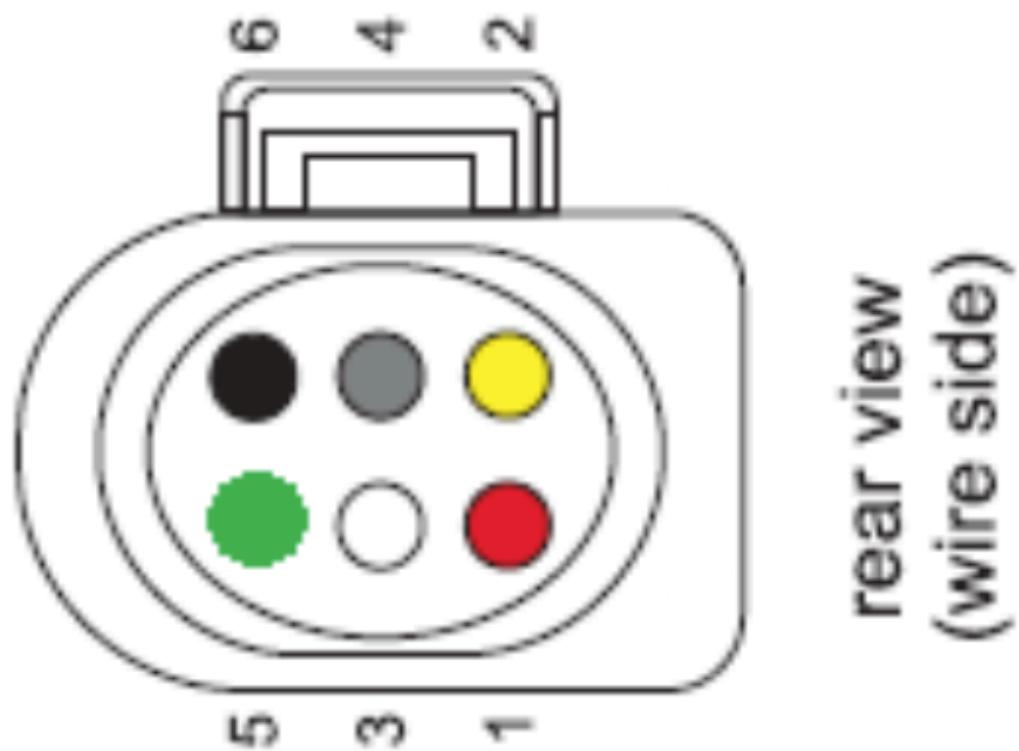
To tune the VE table, a wideband sensor is necessary for measuring the air-fuel ratio.

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.



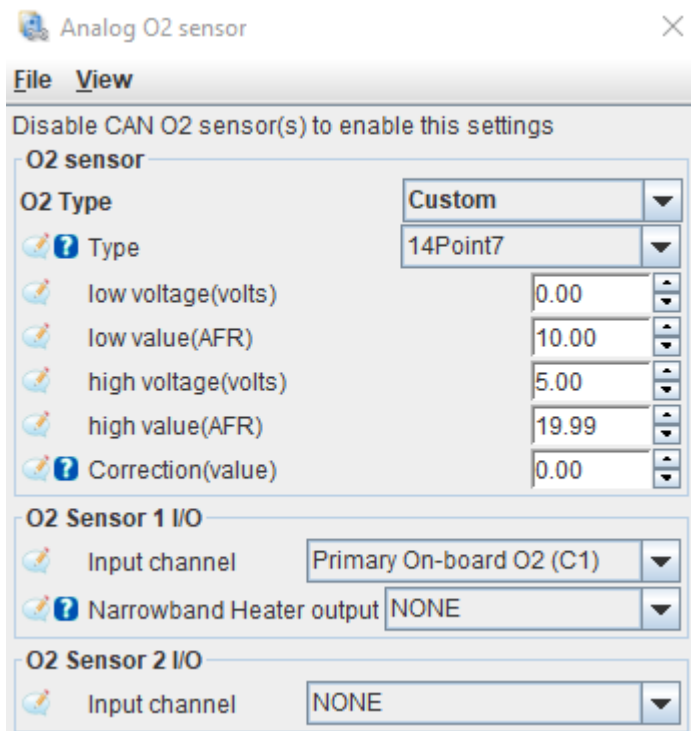
ECU Connector	LSU 4.9 Connector
B20	5 (IA)
B21	6 (NERMEST)
B22	1 (IP)
B23	2 (VGND)

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



12.2. Configure the wideband linear output values



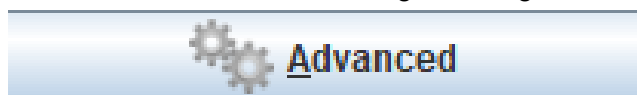


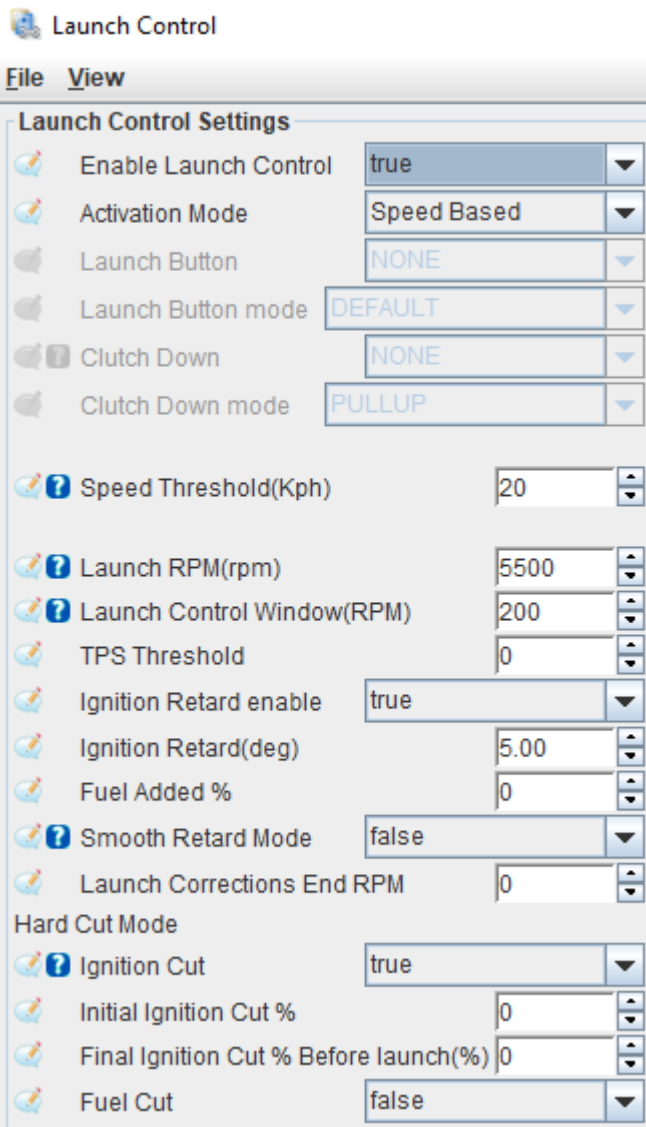
13) Launch control

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.

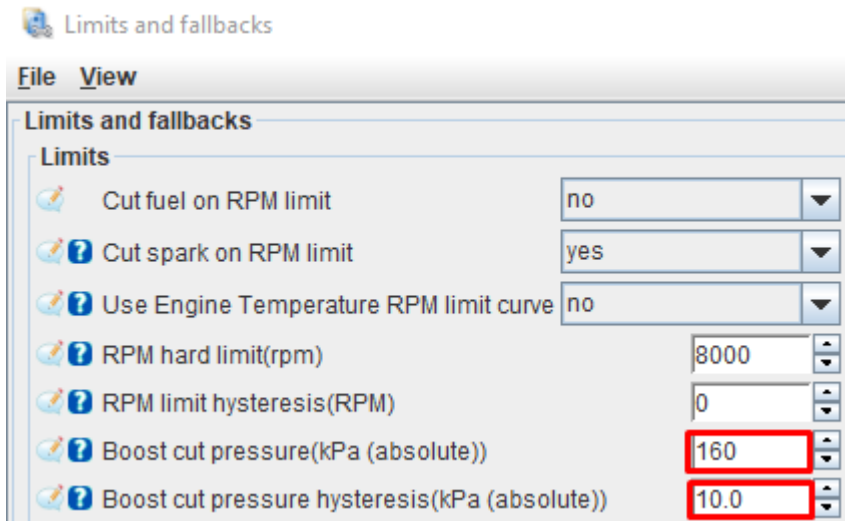
14) Anti-lag

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.



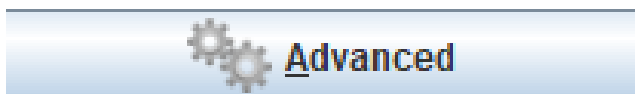
- 15.1. Connect the negative wire of the boost controller valve to an auxiliary low-side output.
- 15.2. Activate a boost limit to protect the engine from overboost.

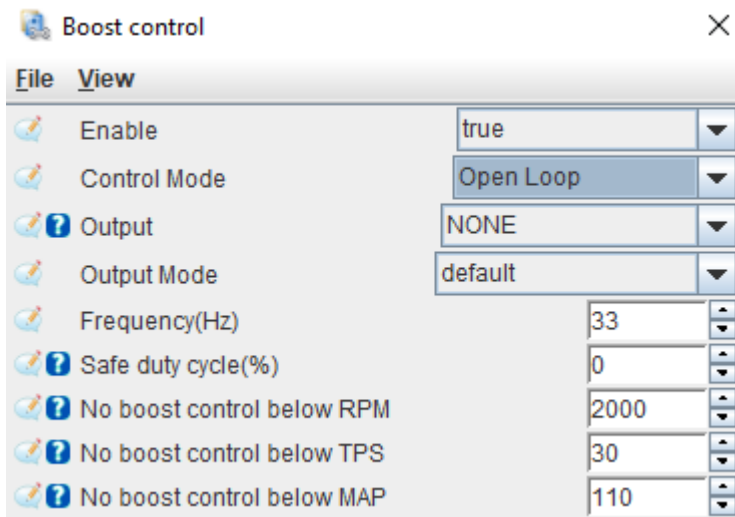


- **Boost cut pressure (absolute):** MAP value above which fuel is cut in case of overboost.
- **Boost cut pressure hysteresis:** If hard cut is 160kpa, and boostCutPressureHyst is 10, when the ECU sees 160kpa, fuel/ign will cut, and stay cut until 160-10=150kpa is reached.
- **160kpa absolute** = 100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

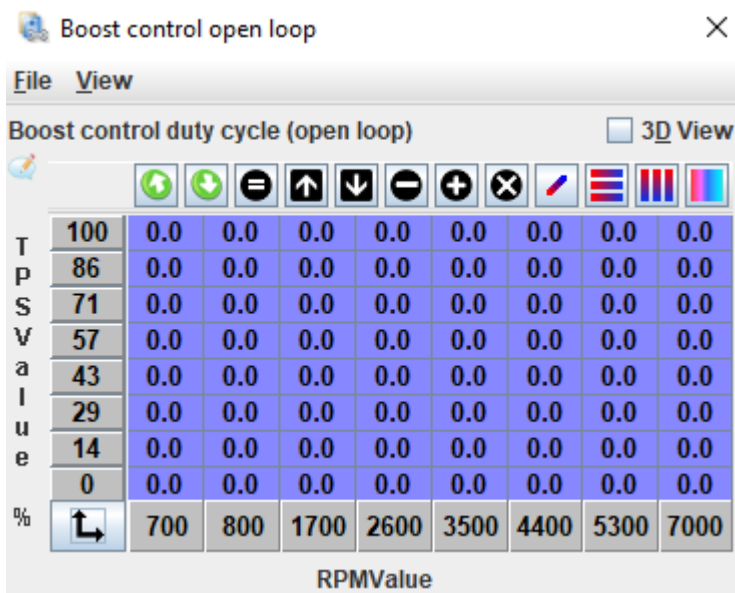
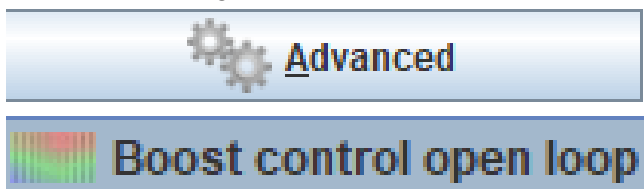
- 15.3. Select **Open-loop** mode and the auxiliary output.

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



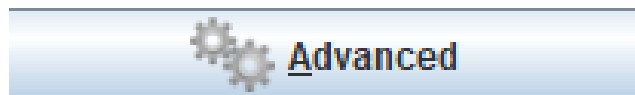


15.4. Configure the Boost control open-loop table.



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.



Boost control PID

File View Help

Enable closed loop above(kPa) 0

P Gain 0.5000

I Gain 0.3000

D Gain 0.0000

Min adjustment -20

Max adjustment 20



Boost control target

File View

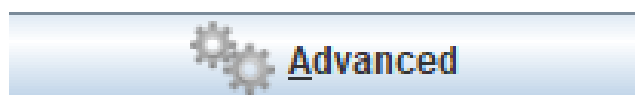
Boost control target (kPa) ☐ 3D View

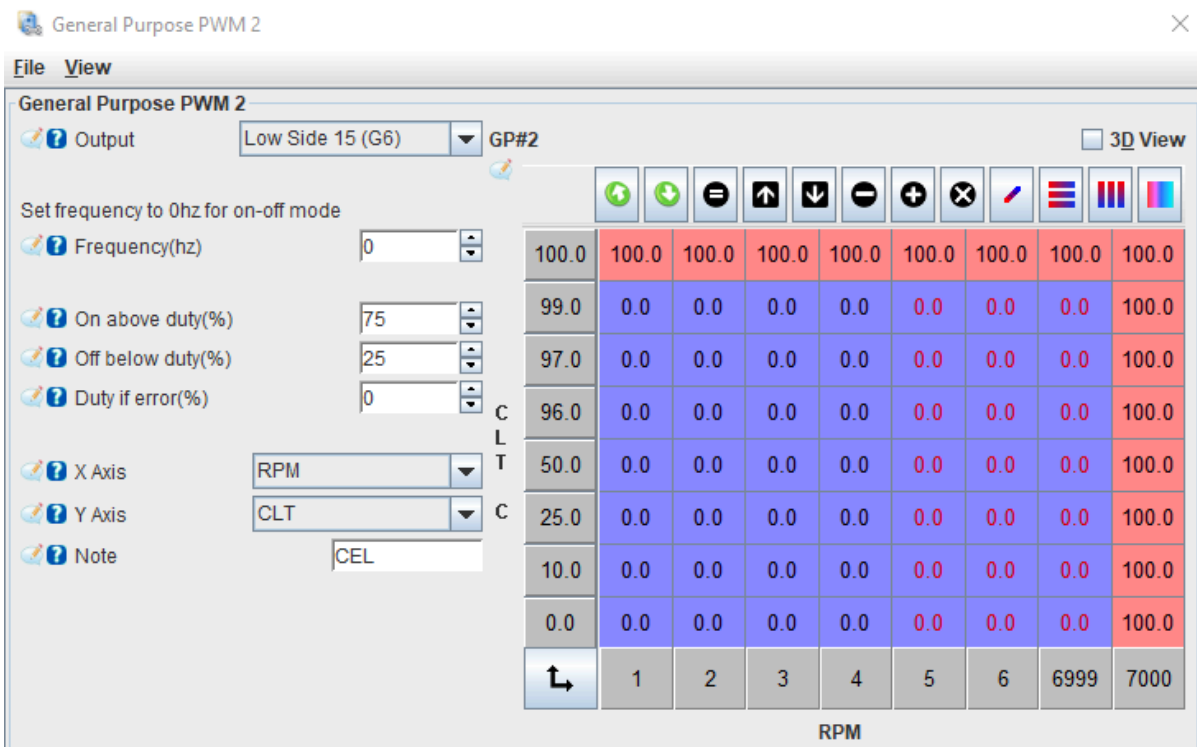
T	100	100	100	100	100	100	100	100	100
P	86	86	86	86	86	86	86	86	86
S	71	72	72	72	72	72	72	72	72
V	57	58	58	58	58	58	58	58	58
a	43	44	44	44	44	44	44	44	44
I	29	30	30	30	30	30	30	30	30
u	14	14	14	14	14	14	14	14	14
e	0	0	0	0	0	0	0	0	0
	↱	700	800	1700	2600	3500	4400	5300	7000

RPMValue

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.





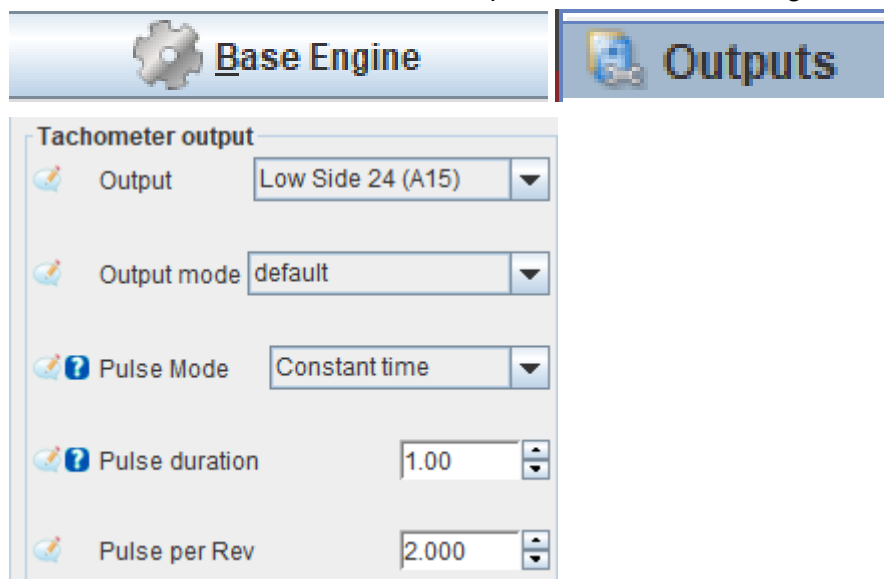
0 = OFF

100 = ON

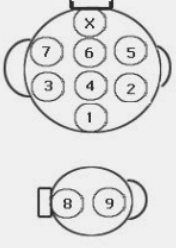
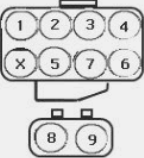
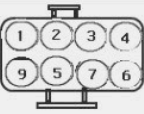
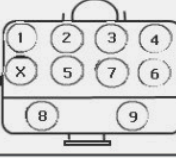
17) Tachometer

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.

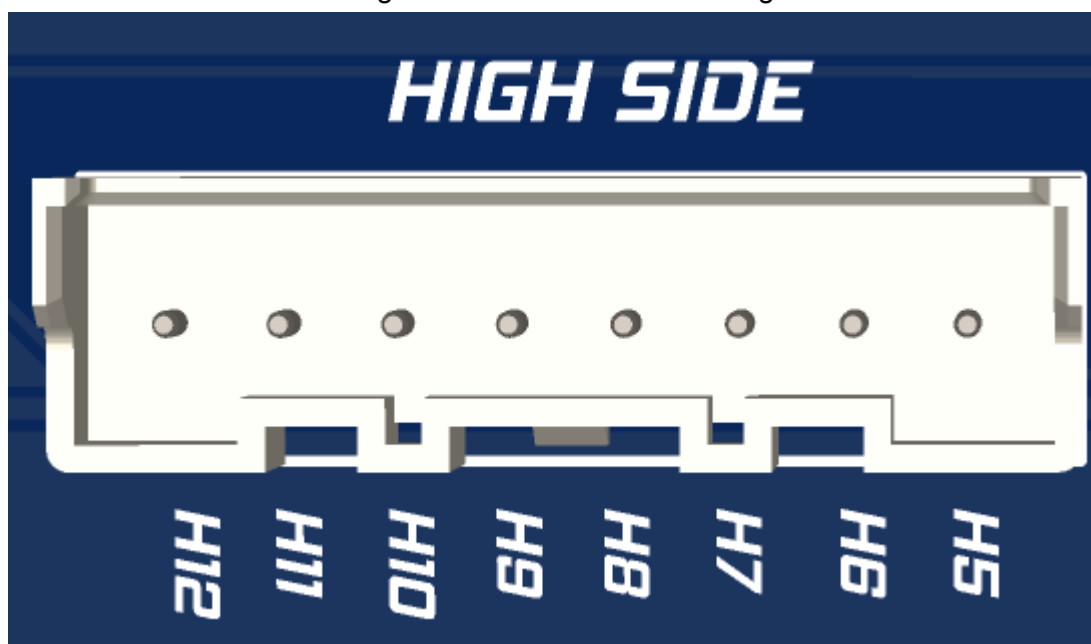
OBD/Model	Plug Type (all plugs are shown from wired side)	Wiring Color and Wire Function (Wire colors may vary pay attention more to the number positions)
OBD0 (except Civic DPFI Models) 1988- 1991		1. Large White (Ign input signal) 2. Orange (Crank position output) 3. Orange/Blue (TDC output) 4. Blue/Green (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.

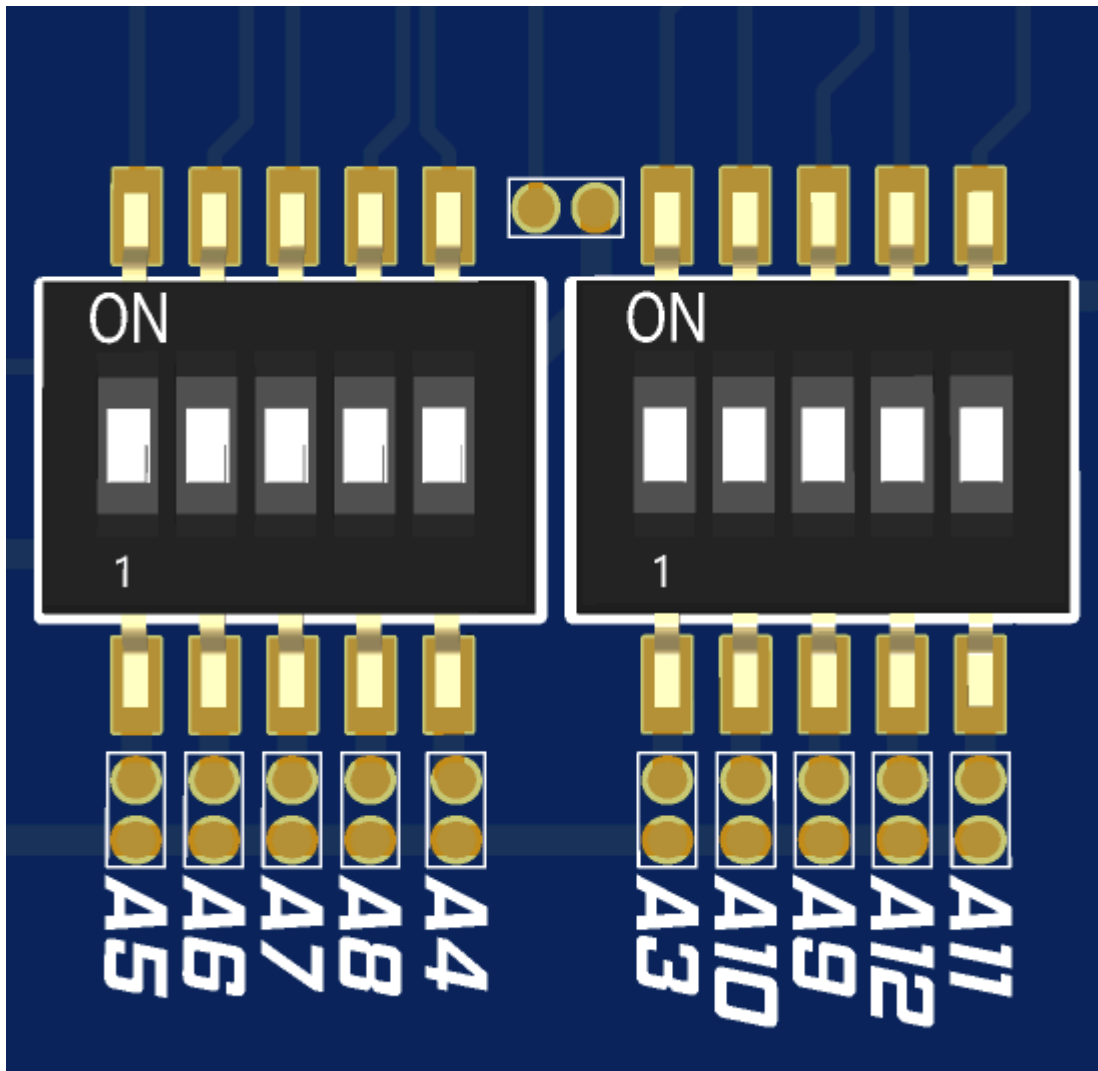
HIGH SIDE: Controls smart ignition coils with 5V or 12V signals.



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

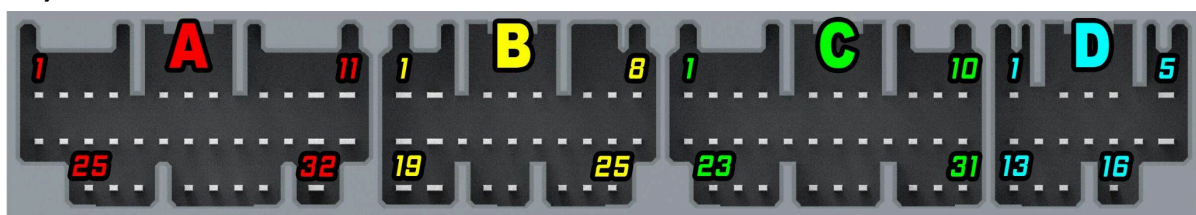
ANALOG: Inputs for sensors with a 0-5V output or for temperature sensors.

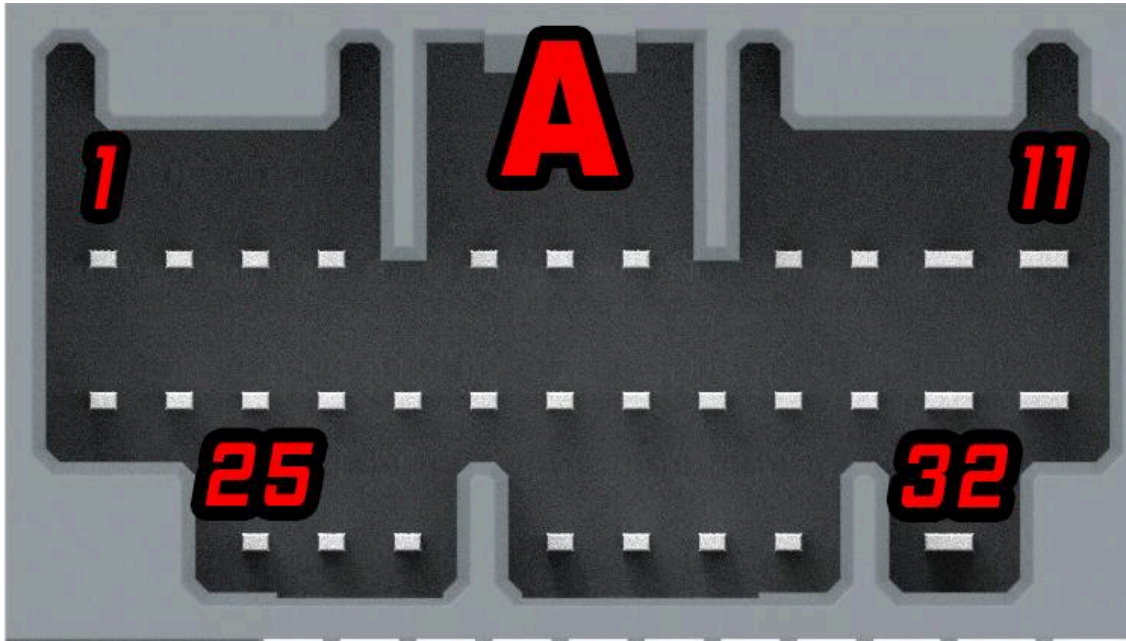
NOTE: To use temperature sensors, the corresponding input switch must be set to the ON position.



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

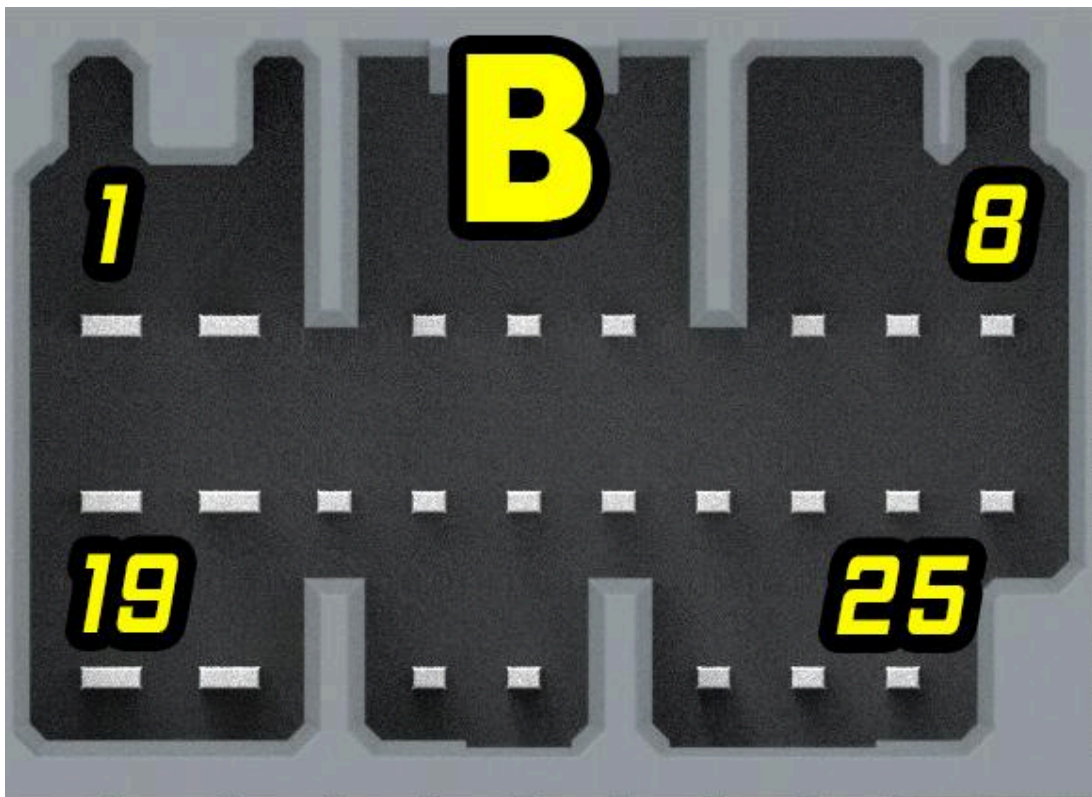
19) ECU PINOUT



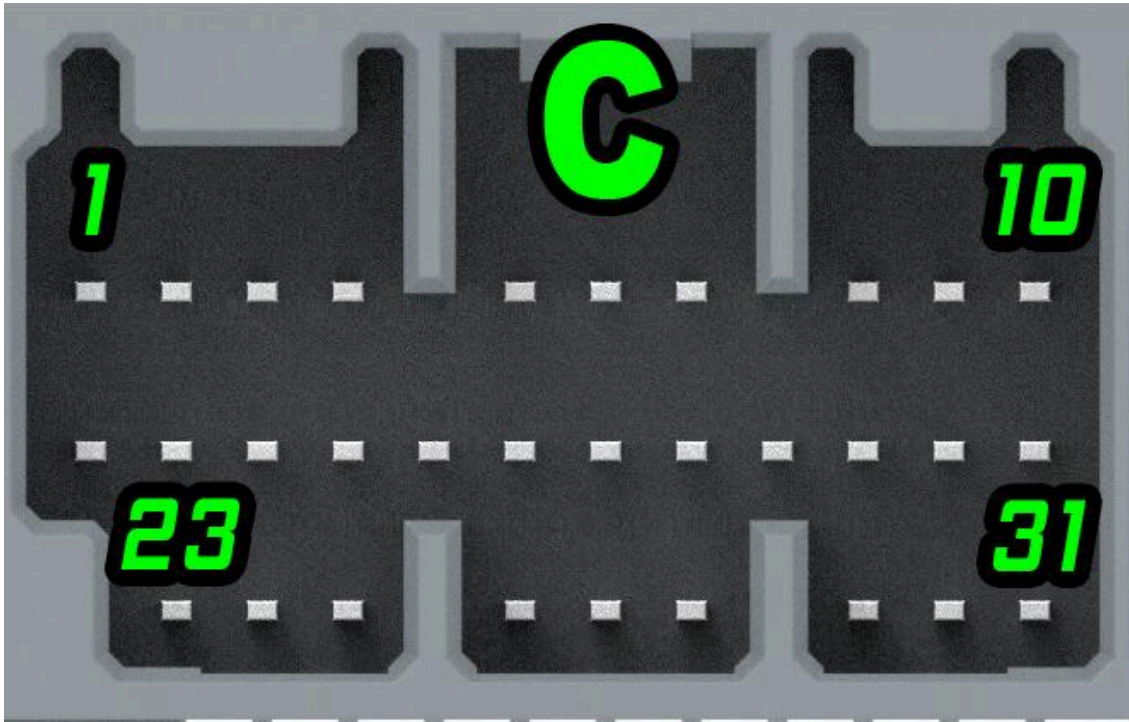


ECU Header	FUNCTION	TUNERSTUDIO
A1	Injector 4	Low Side 4
A2	Injector 3	Low Side 3
A3	Injector 2	Low Side 2
A4	Injector 1	Low Side 1
A5	Secondary O2 Heater Relay	Low Side 5
A6	Primary O2 Heater Relay	Low Side 6
A7	IAB - Intake Air Bypass (Integra)	Low Side 7
A8	VTEC A Solenoid	Low Side 8
A9	Ground	
A10	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		
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

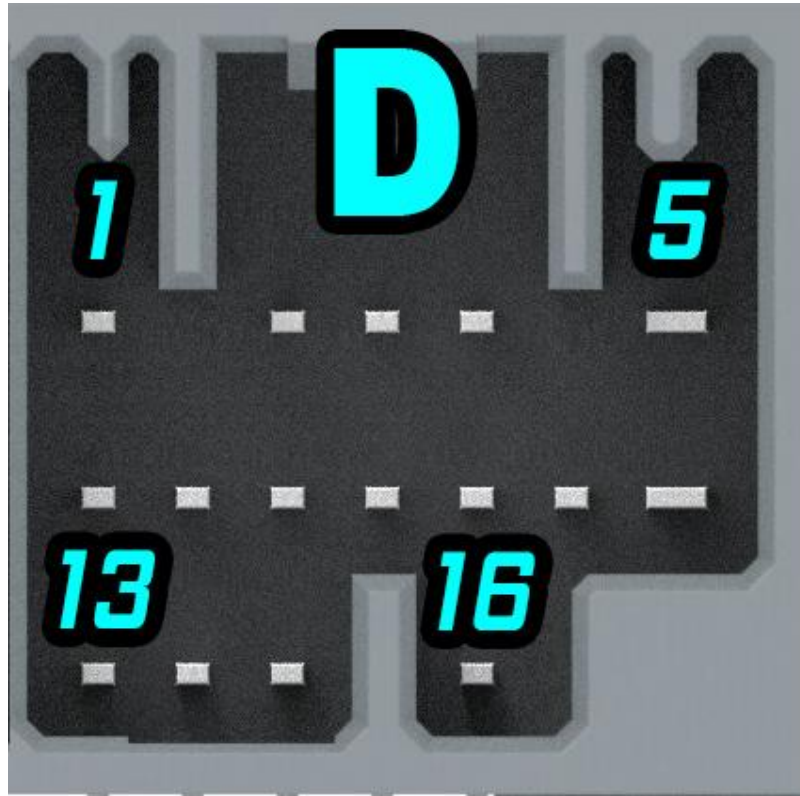


ECU Header	FUNCTION	TUNERSTUDIO
B1	Coil on Plug 1	High Side 1
B2	Coil on Plug 2	High Side 2
B3	Coil on Plug 3	High Side 3
B4	Coil on Plug 4	High Side 4
B5	Tachometer	Low Side 24
B6	x	Digital Input 6
B7	x	Digital Input 7
B8	x	Digital Input 8
B9	x	Analog Input 5
B10	x	Analog Input 8
B11	x	Analog Input 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		



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