ProTunerz STM PRO Plug & Play System User Manual rev 1.2

Preface: Welcome to the ProTunerz STM PRO Plug & Play system! Before proceeding, please carefully review the following technical instructions.

Harness / ECU Installation:

1. Start by disconnecting the vehicle's battery.
2. Remove the original ECU, harness, AFM, and Ignition Module (if installed), as well as any fuses associated with the Electronic Fuel Injection (EFI) system.
3. Mount the ECU in the driver-side kickpanels for optimal placement.
4. To install the harness, route it from the engine bay to the interior through the hole located near the clutch master cylinder.
5. Safeguard the harness from heat and moving parts, such as the steering wheel shaft and radiator fan, using P Clamps or zip ties to secure it to fixed chassis or engine positions.
6. The harness is designed to match each sensor's specific connector, and each sensor is appropriately labeled.

Fusebox/Grounds/Battery/IGN Source Connections:

- Injector and coil connections should be organized as follows: the longest branch corresponds to Cylinder #1 (nearest to the radiator), followed by the second-longest for Cylinder #2, and so on.
- Fusebox connections can be straightforwardly attached to the harness.
- Ensure your vehicle's battery grounds are equipped with two 2-4AWG wires connecting to both the engine and chassis. Confirm that these connections are clean and establish contact with bare metal. Consider applying dielectric grease or a sealant for added protection.
- For the BAT12v + Constant, choose either Bat12v+ or the starter 12v+ connection (BAT12v for a discrete connection).
- The IGN SOURCE switched 12v source should maintain 12v both when the vehicle is in the ON position and during cranking.
- The coil/ECU grounds are provided through the harness and are grounded via a ring terminal to the cylinder head.
- Ground the fuel pump and fan to engine or chassis bare metal, and establish a direct connection to the respective devices.

Required Sensors to install . Mandatory for Engine Operation): All Sensors are included with your package

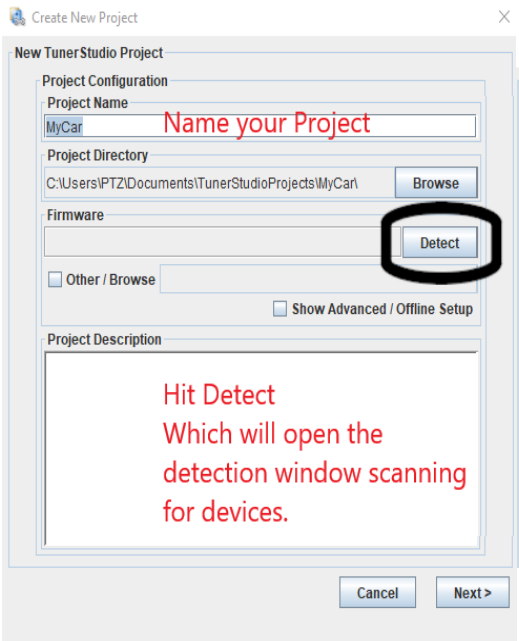
- The MAP (Manifold Absolute Pressure) sensor, integrated into the ECU, requires a vacuum line to be run from the intake to the barb nipple on the ECU. It functions as a replacement for the AFM/MAF, measuring incoming air volume.
- Install the TPS (Throttle Position Sensor) at the throttle body.
- The IAT (Intake Air Temperature Sensor) can be positioned either before or after the throttle body.
- The CLT (Coolant Temperature Sensor) is conveniently accommodated with a metric M12x1.5 GM TEMP sensor, typically compatible with most L-Series Thermostat Housings. In case of incompatibility, our Billet Thermostat Housing kit is available for purchase.
- The CAS (Crank Angle Sensor) is fitted at the crank pulley, inside an L28et distributor, or using the One Six Industries CAS for both Crank and CAM position information.

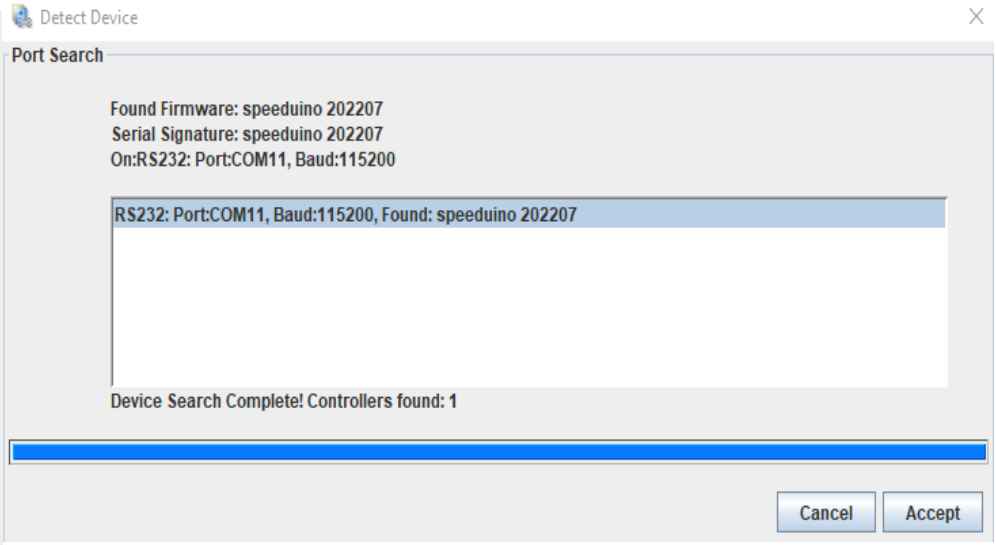
Optional Sensors:

- The VSS (Vehicle Speed Sensor) can be installed on the transmission where a mechanical sensor would traditionally be found. This sensor provides a speed signal to the ECU. You would only replace this if you have an aftermarket Speedometer. Adding this sensor to your cable driven gauge would stop your speedometer from functionality.
- OIL/FUEL 1/8th NPT Pressure sensors are primarily intended for ECU monitoring and fail-safe configuration. Install Fuel Pressure Sensors at the regulator or rail and Oil Pressure Sensors on the engine block using suitable adaptors. These sensors are designed for ECU data, not dashboard display.
- For the IAC (Idle Air Control) valve, the ECU supports two types: the 2-wire PWM style, akin to early Bosch VW/Ford/Volvo systems, or the 4-wire Stepper IAC GM, which mounts at the throttle body.
- While flex wiring is available, it does not include the sensor. This wiring is designed for the GM/Continental Flex Fuel Sensor, which measures E85 content and temperature.
- The Electronic Boost Solenoid (EBC) is a 2-wire system for controlling a pneumatic solenoid. Polarity does not affect its operation.

ECU Software + Setup

- The STMPRO utilizes TunerStudioMS, which is found online or in the USB drive supplied
- Installation of the software on your computer is required..
- Optionally, registering the software online or via the software itself is recommended to unlock the auto-tune feature. Note that this feature necessitates a Wideband O2 controller and O2 sensor.
- **Step 1:** Begin by connecting the ECU to your laptop. Turn the ignition ON without cranking the engine. The computer will automatically detect the new device and proceed to install the ECU driver. Once the driver installation is successful, launch TunerStudio MS.
- **Step 2:** Click "New Project" and assign a name of your choice. Select the "Detect" button within the Create New Project menu to initiate ECU detection. Upon detection, click "Accept." Ensure TunerStudio does NOT use the firmware found online rather you'll need to select "Other/Browse" and navigate to the firmware .ini File found in the usb drive supplied OR download at ProTunerz.com .Ensure that the downloaded firmware matches the detected one (e.g., "Speeduino ######"). Click "Next."





- FIGURE 1 It is critical to select "STM32" under "Controller in use" . For serial Mode activate "NEW_COMMS." and for new firmware you can put “compatibility mode” . Choose the appropriate units for PSI/AFR and Fahrenheit or Celsius. Click "Next," then "Finish," and select your dashboard. When all sensors and the ECU are correctly connected and powered on, you should observe live data such as temperature and TPS. If any discrepancies are noted, review your preceding steps, validate battery/ground connections, ensure software installation is complete, and confirm that the driver installation is error-free.
- FIGURE 2 Under “Settings” and “Engine Constants” ensure that “STM PRO” is set up for the BOARD LAYOUT.

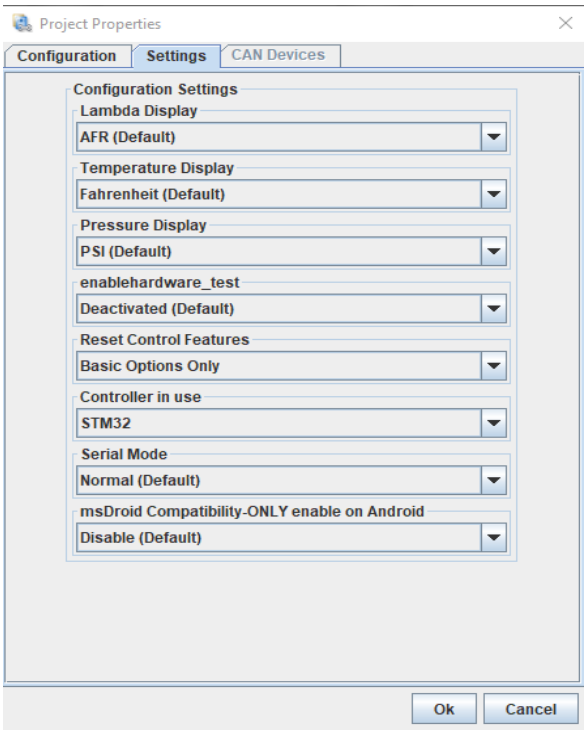


FIGURE 1

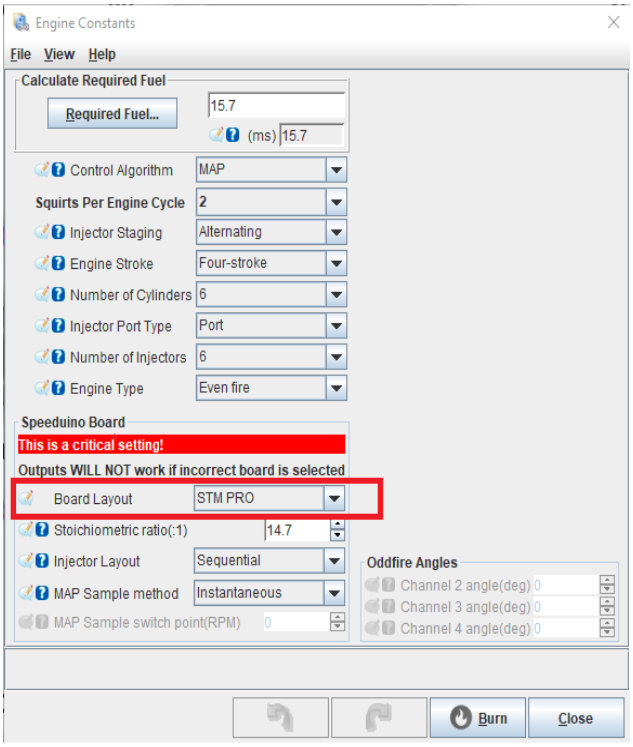
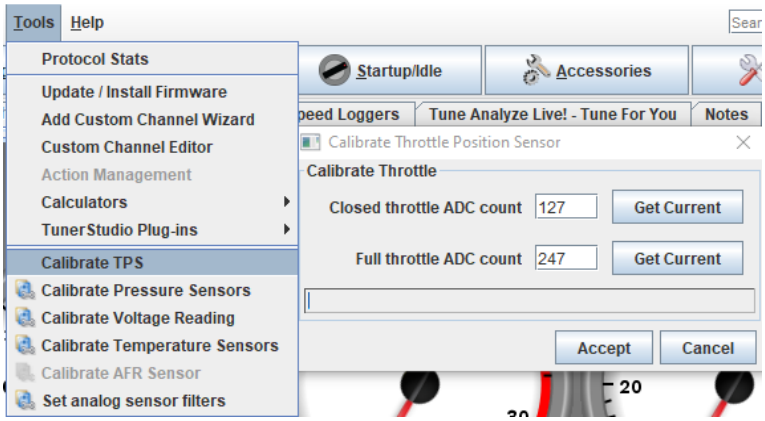


FIGURE 2

ECU Calibrations & First Start:

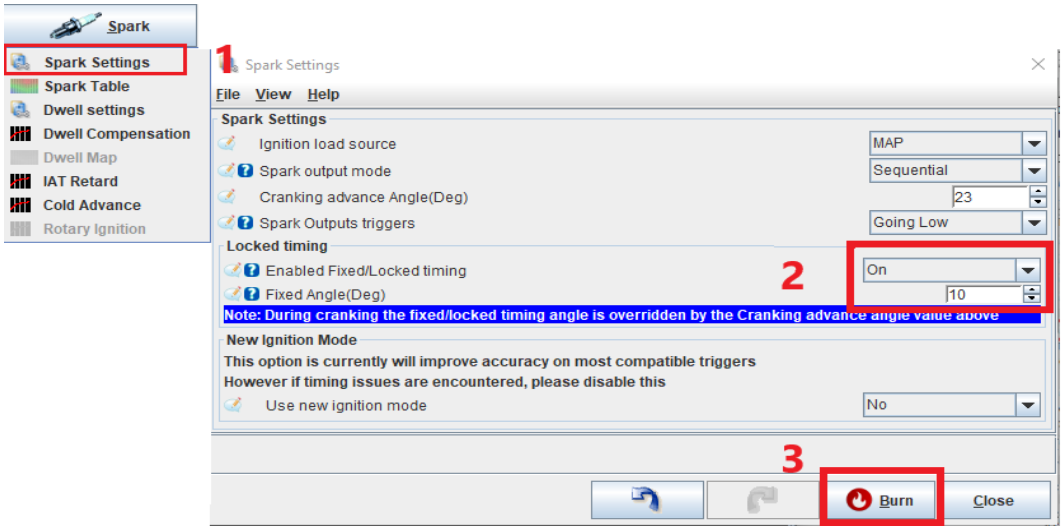
- In TunerStudio, navigate to "TOOLS," and proceed to calibrate the TPS.
- With the throttle pedal closed, click "Get Current." Then, with the pedal fully depressed, click "Get Current" once more. Subsequently, click "Accept" and verify that the changes are accepted.

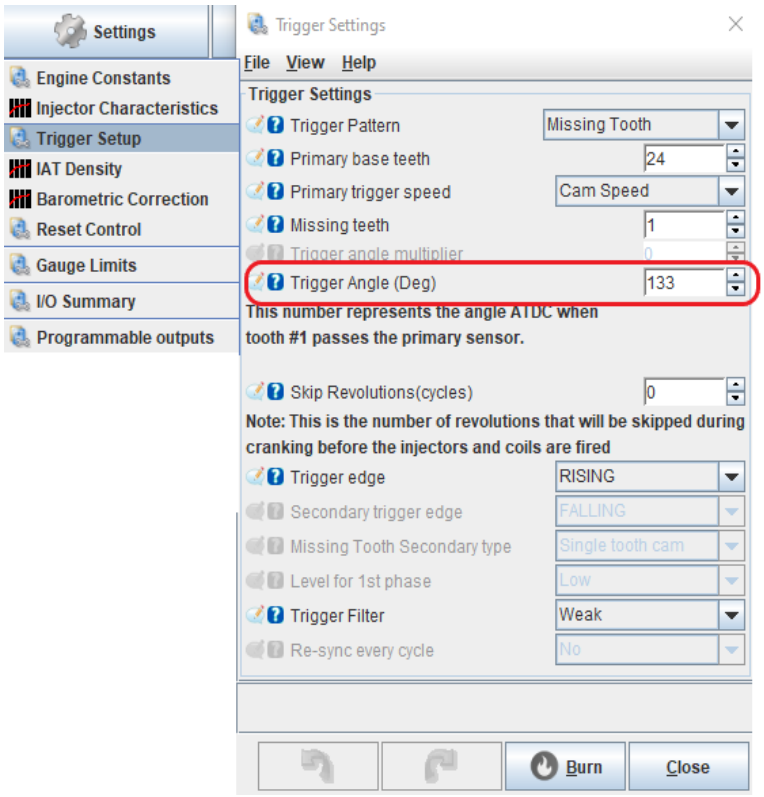


Calibration of the AFR Sensor may be necessary if it was not supplied with your kit.

Trigger Angle Setup

- Default ignition base settings have been preconfigured for your convenience. Typically, no adjustments are required unless specific alterations are covered in these instructions. Verify that your engine timing, encompassing cam, crank, chain, oil pump shaft, and distributor, aligns with OEM specifications as detailed in the Factory Service Manual.
- With the ECU connected, access "Settings" and select "Trigger Setup." Focus solely on configuring the Trigger Angle while refraining from altering other settings. Maintain this window open and proceed to "Spark" -> "Spark Settings." Change "Enabled fixed/Locked Timing" from "OFF" to "ON" and set the "Fixed Angle (deg)" to 10°. Click "BURN."
- Retrieve a timing gun, enlist assistance for engine cranking, align the engine to Top Dead Center (TDC), and verify that the timing indicator's 0 mark corresponds with the crank pulley notch. Subsequently, adjust the trigger angle until the timing light accurately aligns with the 10° mark. Commence with larger increments (e.g., 30-60) if the initial alignment is significantly off, gradually reducing the setting. The goal is to achieve precise alignment with the 10° mark. Once completed, click "BURN" and revert "Fixed Angle" to "OFF," then click "BURN" once more.





Final Setup and Tuning:

- The ECU comes pre-loaded with a base tune. However, it is crucial to acknowledge that various factors, including voltage variations, grounding, elevation, fuel type, engine compression, and timing can substantially influence engine tuning requirements.
- Before attempting the first engine start, ensure the vehicle's battery is fully charged, all ground connections are secure and clean, fuel pressure is set to 43.5 psi, fresh gasoline is available, there are no vacuum leaks, and all mandatory sensors are connected.
- Crank the Car over it should start and idle you may have to open the idle screw a bit to let a bit more air into the engine. While idling we want to repeat the Trigger angle setup to ensure we do not have timing drift and the light shining exactly on 10 while being “fixed”

- You can now setup the auto tune and tune gradually tune the idle, cold start, light blips, reving with no load then driving lightly and into engine power. There are many videos on YouTube to show the autotune feature search “autotune Megasquirt or Tunerstudio”

STMP PRO I/O + EXPANSION CONNECTIONS: The following table illustrates the function, internal pin, ECU connector pin, and color codes for various I/O functions and expansion connections. This information serves as a valuable reference when establishing additional connections.

STMP PRO I/O + EXPANSION CONNECTIONS.

Function	I/O Name	Ecu internal Pin	ECU Connector Pin	Color
Fuel Pressure	Analogue A12	56	C1 . 14	Pink/Blue
Oil Pressure	Analogue A7	51	C1 . 16	Pink/Red
OXYGEN 02	Analogue A10	54 (board default)	C1 . 20	Pink
Flex Fuel	Digital In Flex	11	C1 . 22	Orange/Green
Speed Sensor	Digital in 1	71 (board default)	C1 . 9	Orange/Blue
IAC PWM	Digital Out Idle1	27	C1 . 7	Brown/Green
Boost	Digital Out boost	28	C1 . 12	Brown/Red
Tach out	Digital Out Tach	43	C2 . 31	L.Green/Orange
Fan	Digital Out Fan	42	C2 . 34	L.Green/Black
GM IAC C1.24 Blue/white IAC1B C1.25 Blue/red IAC2A C1.23 D. Green/White IAC2B C1.22 D. Green/Red				

Tach Adaptor (if applicable):

- Locate the stock tachometer resistor within the vehicle's interior. For ZX models, this resistor is typically situated above the stock ECU, while 280z models typically position it under the glove box. 280Z models its easier to wire the tach output directly to the peg behind the tachometer.
- One wire from the resistor connects to the dashboard/tachometer, while the other extends to the engine bay, usually in blue color.
- Remove the tachometer resistor and employ an ohmmeter to determine which wire connects to the old coil negative. Establish a connection between the Tach out from the adapter and the wire that does not lead to the old coil negative. Wire colors may vary according to the vehicle's model.
- For aftermarket tachometer use pin 3 from the Tach Deautsch Connector to wire directly to Tachometer.

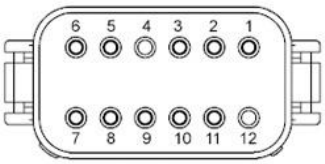
"Expansion 1"

6 pin Connector

From	To	Conductor	Color
EXP_C5.1	ECU_C2.20 CAN HIGH	C2_20.TAN	
EXP_C5.2	ECU_C2.21 CAN LOW	C2_21.TAN-Red	
EXP_C5.3	ECU_C1.17_ANALOGUE_A8	C1_17.Pink-Brown	
EXP_C5.4	ECU_C2.13	C2_13.Gray	
EXP_C5.5	ECU_C1.10_DIGITAL_IN_2	C1_10.Orange-Yellow	
EXP_C5.6	ECU_C1.11_DIGITAL_IN_LAUNCH	C1_11.Orange-Red	

Since this ECU has so much more inputs and outputs on top of our PRO STM HARNESS features. We also Setup two Expansion Connectors. These Connectors come in handy for future use and make it easy to make connections inside your Engine bay or Interior. Below is the pin out for the 2 connectors. The Deutsch Connectors are labeled behind for each position. Example Expansion 1 connector Pin 1 is Can HIGH. Launch is pin 6

From	To	Conductor	Color
EXP_C7.1	ECU_C2.14	C2_14.Yellow-Violet	
EXP_C7.2	ECU_C2.15	C2_15.Yellow-Blue	
EXP_C7.3	ECU_C1.3_INJG	C1_3.White-Blue	
EXP_C7.4	ECU_C1.4_INJH	C1_4.White-Violet	
EXP_C7.5	ECU_C1.5_DIGITAL_VVT_OUTPUT	C1_5.Brown-White	
EXP_C7.6	ECU_C1.6_DIGITAL_OUT_IDLE2	C1_6.Brown-Black	
EXP_C7.7	ECU_C1.8_ANALOGUE9	C1_8.Pink-White	
EXP_C7.8	EXP_C5.4	W37.Gray	
EXP_C7.9	ECU_C1.22_ANALOGUE_EXTMAP	C1_22.Pink-Violet	
EXP_C7.10	ECU_C2.10	C2_10.Red-Blue	
EXP_C7.11	12V_MAIN	W42.Red	
EXP_C7.12	ECU_GROUND	W43.Black	



"Expansion 2" Connector

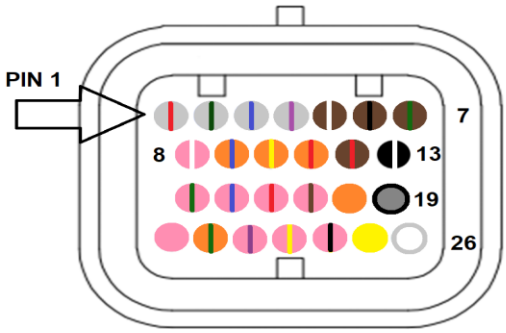
With the comprehensive technical instructions at your disposal, you are well-equipped to maximize the functionality and performance of the ProTunerz STM PRO Plug & Play system. In case of any further inquiries or requirements, do not hesitate to contact our technical support team. Enjoy your ProTunerz experience, and drive with confidence in your optimized engine control system

C1	ECU PIN	I / O	Function	COLOR
1	62	DIGITAL OUT	INJECTOR D	WHITE/RED
2	64	DIGITAL OUT	INJECTOR F	WHITE/DK. GREEN
3	67	DIGITAL OUT	INJECTOR G	WHITE/BLUE
4	66	DIGITAL OUT	INJECTOR H	WHITE/VIOLET
5	71	DIGITAL OUT	VVT OUTPUT	BROWN/WHITE
6	12	DIGITAL OUT	IDLE 2 OUPUT	BROWN/BLACK
7	27	DIGITAL OUT	IDLE 1 OUTPUT	BROWN/GREEN
8	A5/49	ANALOGUE IN	ANALOGUE A9 IN	PINK/WHITE
9	71	DIGITAL IN	DIGITAL IN 1 VSS	ORANGE/BLUE
10	40	DIGITAL IN	DIGITAL IN 2	ORANGE/YELLOW
11	4	DIGITAL IN	LAUNCH INPUT (LOW)	ORANGE/RED
12	28	DIGITAL OUT	BOOST OUTPUT	BROWN/RED
13		SENSOR GROUND	SENSOR GROUND	BLACK/WHITE
14	A0/44	ANALOGUE IN	INTAKE AIR TEMP	PINK/GREEN
15	A12/56	ANALOGUE IN	ANALOGUE A6 FUEL P.	PINK/BLUE
16	A7/51	ANALOGUE IN	ANALOGUE IN A7 OIL P.	PINK/RED
17	A6/50	ANALOGUE IN	ANALOGUE A8 IN	PINK/BROWN
18		TRIGGER IN	CAM INPUT VR2-	ORANGE
19		TRIGGER IN	CRANK INPUT VR2-	BLACK/SHIELDED
20	A10/54	ANALOGUE IN	02 INPUT	PINK
21	11	ANALOGUE IN	FLEX FUEL	ORANGE/GREEN
22	A2/46	ANALOGUE IN	EXTERNAL MAP	PINK/VIOLET
23	A3/47	ANALOGUE IN	COOLANT TEMP	PINK/YELLOW
24	A1/45	ANALOGUE IN	THROTTLE TPS	PINK/BLACK
25	0	TRIGGER IN	CAM INPUT VR2+	YELLOW
26	1	TRIGGER IN	CRANK INPUT VR1+	WHITE/SHIELDED

REFER TO HEAT SHRINK FOR COLOR

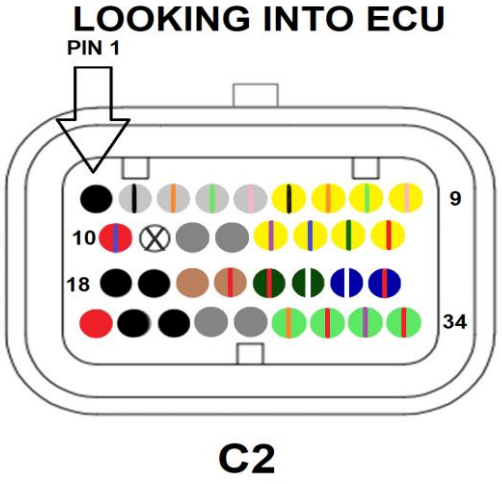
- INJECTOR OUTPUTS
- IGNITION OUTPUTS
- LOW CURRENT OUTPUT
- GROUNDS
- SENSOR VREF 5V+
- POSITIVE SWITCH OUTPUT
- HIGH CURRENT OUTPUT
- ANALOGUE INPUTS
- DIGITAL INPUTS
- SENSOR GROUND
- STEPPER IAC1
- STEPPER IAC 2
- CAN BUS
- *TRIGGER INPUTS*
- CRANK INPUT VR1+
- CRANK INPUT VR1-
- CAM INPUT VR2+
- CAM INPUT VR2-

LOOKING INTO ECU



C1

C2	ECU PIN	I / O	FUNCTION	COLOR
1		GROUND	GROUND	BLACK
2	32	DIGITAL OUT	INJECTOR A	
3	31	DIGITAL OUT	INJECTOR B	
4	30	DIGITAL OUT	INJECTOR C	
5	29	DIGITAL OUT	INJECTOR D	
6	8	DIGITAL OUT	IGNITION A	
7	2	DIGITAL OUT	IGNITION B	
8	24	DIGITAL OUT	IGNITION C	
9	34	DIGITAL OUT	IGNITION D	
10	37	DIGITAL OUT	GOING HIGH +	
12		VREF	+5V OUTPUT	
13		VREF	+5V OUTPUT	
14	61	DIGITAL OUT	IGNITION H	
15	63	DIGITAL OUT	IGNITION G	
16	33	DIGITAL OUT	IGNITION F	
17	36	DIGITAL OUT	IGNITION E	
18		GROUND	GROUND	BLACK
19		GROUND	GROUND	BLACK
20		CAN BUS	CAN HIGH	
21		CAN BUS	CAN LOW	
22		IAC STEPPER	IAC2B	D. GREEN/RED
23		IAC STEPPER	IAC2A	D. GREEN/WHITE
24		IAC STEPPER	IAC1A	BLUE/WHITE
25		IAC STEPPER	IAC1B	BLUE/RED
26		ECU POWER	+12v POWER input	RED
27		GROUND	GROUND	BLACK
28		GROUND	GROUND	BLACK
29		VREF	+5V OUTPUT	
30		VREF	+5V OUTPUT	
31	43	DIGITAL OUT	TACH OUTPUT	
32	3	DIGITAL OUT	SPARE OUTPUT	
33	39	DIGITAL OUT	FUEL PUMP OUTPUT	
34	42	DIGITAL OUT	FAN OUTPUT	



FUSEBOX

TOP VIEW