PERFECT TUNING

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MS3Pro-PNP

Toyota Chaser JZX100 1996-2001 manual transmission

User Manual

Hardware Revision 1

Table of content

Warning

All parts are sold for OFF ROAD RACE-ONLY ground-vehicle use only, or vehicles that predate any federal and state emissions control requirements. Aftermarket EFI/EMS systems are not for sale or use on pollution controlled vehicles.

Race parts are inherently dangerous and may cause injury or damage if improperly modified or altered before use. Perfect Tuning will not be held liable for and will not pay you for any injuries or damage caused by misuse, modification, redesign, or alternation of any of our products. Perfect Tuning will not be held in any way responsible for any incidental or consequential damages including direct or indirect labor, towing, lodging, garage, repair, medical, or legal expense in any way attributable to the use of any item in our catalog or to the delay or inconvenience caused by the necessity of replacing or repairing any such item.

All supplied Perfect Tuning calibrations, Wizards and other tuning information are offered as potential starting points only. IT IS THE RESPONSIBILITY OF THE ENGINE TUNER TO ULTIMATELY CONFIRM IF THE CALIBRATION IS SAFE FOR ITS INTENDED USE. Perfect Tuning holds no responsibility for any engine damage that results from the misuse or mistuning of this product!

Documentation, technical support, discussion forums for all versions of MS3Pro is available at http://msextra.com
The MS3Pro user manual is full of information for the Perfect Tuning MS3Pro-PNP as this MS3Pro-PNP is based on the MS3Pro. http://www.ms3pro.com/downloads.html

Installation of TunerStudio and MegaLogViewer (for Windows, Mac and Linux)

- **TunerStudio** is the software created by EFI Analytics used to configure all versions of the MS3Pro. The software with basic functionalities is free. For advanced features like custom dash boards, auto tuning and diagnostics you need to purchase the software. It's possible to download directly TunerStudio at: www.tunerstudio.com/index.php/downloads. When a computer is connected to a *MS3Pro* for the first time with an USB cable, a driver may be needed: http://www.ftdichip.com/Drivers/VCP.htm

  Here is a custom dashboard created by users on MsExtra forum. You can see more dashboards in this thread at: http://msextra.com/forums/viewtopic.php?f=122&t=36862&start=80 like these from different users:

- **MegaLogViewer** is the software used to view the data logs created by TunerStudio, internal MS3Pro memory or even the data logs created by the Android phone or tablet software. The software is also free but you need to purchase if you want to have access to nice features like Scatter plots. www.tunerstudio.com/index.php/downloads
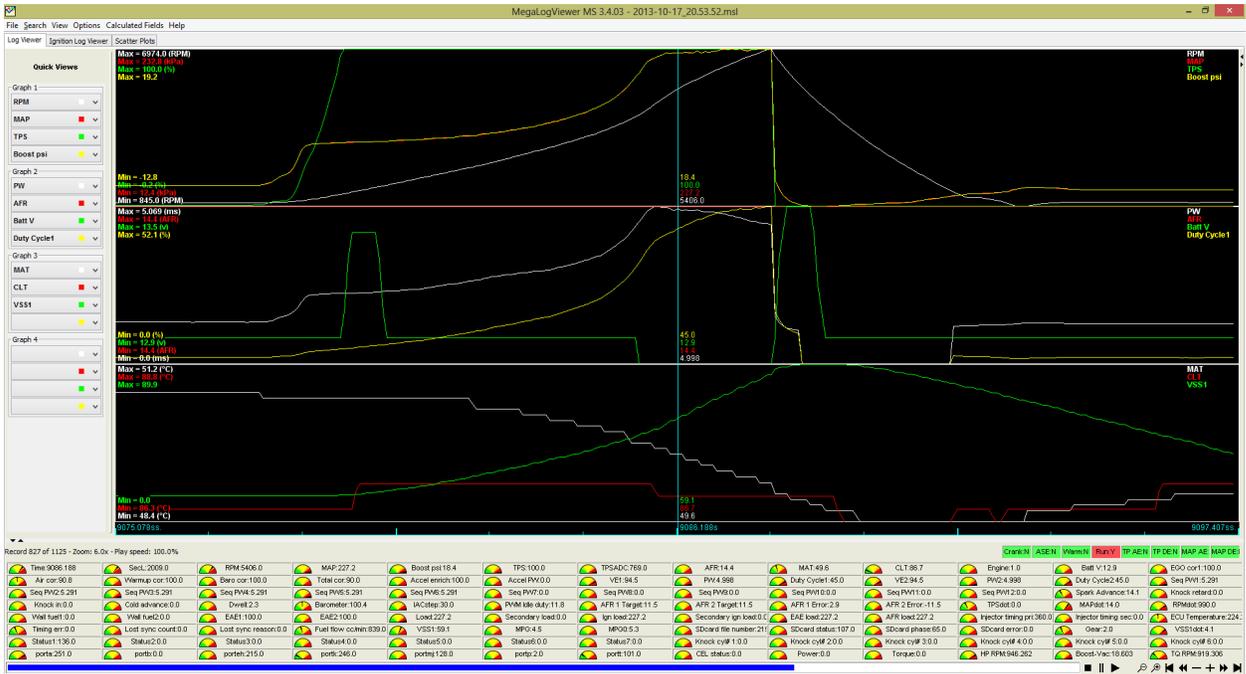
Software for Android devices

- **Shadow Dash MS** is the Android TunerStudio version. You can download it here :
  https://play.google.com/store/apps/details?id=com.efiAnalytics.shadowdash for 9.99$
- **MsDroid** display real-time data and it's also possible to edit the tune. The software is completely
  free! https://play.google.com/store/apps/details?id=com.msdroid.
  If MsDroid shows a connection error message go to
  http://www.msextra.com/doc/ms3/files/release/ and downloads your MS3Pro software version
  (by default 1.4.0) and extract the ms3pro.ini file to the MsDroid/ini folder on your Android
  device.
- **RealDash** is a new application available for Android, iPhone and Windows that can display really
  nice dashes. Still in beta in April 2016.

Software for Apple devices (iPhone, iPad)

- **MobiSquirt** is available for iPhones but with limitations. The Bluetooth connection is not
  supported and you need the internal WIFI adapter. For more information please visit
  www.mobisquirt.org
- **RealDash** is a new application that will be available for iPhones with really nice dashes. Still no
  official releases in April 2016. This requires the internal WIFI module.

Installation of the MS3Pro Plug and Play.

The MS3Pro-PNP will work with JZX100 Toyota Chaser 1996-2001 with 1JZ-GTE VVTI engine without drive by wire. JZX110 is not supported because the ecu header is very different..

1JZ-GTE (c 09.1996 r.) VVTi ECM Pinout
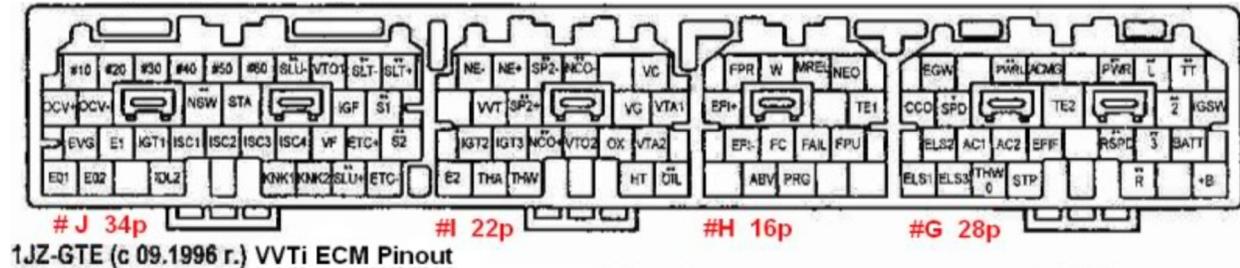
1.   Connect the MS3Pro-PNP

- Disconnect the Battery.
- The factory ECU is located under the passenger floor mat. Remove the protector cover, unscrew the factory ECU and install the JZX100 MS3Pro-PNP.
- It's possible to use the factory MAP sensor but the factory one is limited to 17 psi so to use the internal 4 bar (44psi) MAP Sensor, add a vacuum hose/tube to the MS3Pro-PNP unit. Connect the vacuum tube to the original map sensor port. Ideally try to plug only the MS3Pro-PNP to this port.
- Reconnect the battery.

2.   Power Up the MS3Pro-PNP

Put the key on when the ECU is connected and listen if you can hear the fuel pump running for around 3 seconds then turn off. This indicates that the MS3Pro-PNP is functional. Red LED will also turn ON when there is 12v at the MS3Pro-PNP.

3.   Connection to the MS3Pro-PNP with TunerStudio and a USB or serial cable.

You have to install the software drivers for the MS3Pro if it does not install automatically. You can download it on the FTDI website at: http://www.ftdichip.com/Drivers/VCP.htm. If you are using a USB to serial adapter, please refer to the manufacturer website for the drivers.

1. Plug the USB cable to the MS3Pro-PNP and your computer
2. Open TunerStudio.
3. Press on **File**, **Project**, **New Project**
4. Give a project name.

5. Put the key in the ON position to power up the MS3Pro and click on **Detect**. TunerStudio will automatically detect the MS3Pro. If this step fails, put key in the off position and try again.
6. Press **Next**
7. The next window will let you choose between units you will want to use (Fahrenheit or Celsius). Leave the other options to default and press **Next**.
8. The next window is to connect Tuner Studio to the MS3Pro. Be sure to select the right port. The baud rate will always be at 115 200.
9. Choose the desired dashboard. Click **Apply**.
10. You are now connected to your MS3Pro-PNP.

For more information refer to the MS3Pro user manual: http://www.ms3pro.com/downloads.html

4.   Calibrate the «TPS» (throttle position sensor)

Turn the key to the ON position, and then connect TunerStudio to the MS3Pro-PNP. Go to **Tools**, **Calibrate TPS** then click on **Get Current** for the **closed throttle ADC count** while NOT touching the gas pedal. Now with the gas pedal fully pressed, click on **Get Current** for the **Full throttle ADC count**.

5.   Calibrate the IAT (intake air temperature) and CLT (coolant temperature)

To calibrate the sensors, you have to connect TunerStudio to the MS3Pro then go to **Tools**, **Calibrate Thermistor Tables**. Select **Air Temperature Sensor** for Sensor Table and **3 Point Therm Generator** then in **Common Sensor Values**, select your sensor. Press on **Write to Controller**. Do that again for the other sensor.

6.   Calibrate the Wideband

If a wideband is used and it's suggested, connect it to open TunerStudio. In TunerStudio, select **Tools**, **Calibrate AFR**. Select your wideband sensor in the list or select **Custom Linear WB** and enter the values manually with the manufacturer specifications.

If the internal wideband controller is used, select **Custom Linear WB** then enter 0v = 10 AFR, 5v= 20 AFR.

7.   *** IMPORTANT *** Check the timing and Check It Again!

This step is here to ensure that the timing of the MS3Pro is synchronized with the engine. If you do not perform this step, **YOU CAN DAMAGE OR DESTROY YOUR ENGINE**.

Connect MS3Pro to Tuner Studio then go to **Ignition Settings** and in the field **Fixed Advanced**, select **Fixed timing**. Enter the value **10** at the **Timing for Fixed Advance** field.

Start the engine with fixed timing at 10 degrees. Check with a timing light if the timing is right. If not, you need to adjust **Tooth #1 Angle**. Then, rev the engine and ensure that the timing stay at 10 degrees. If the

timing drift, you can play with the setting **Spark Hardware Latency**. Something between 20 and 120 should be good.

Other info here: http://www.diyautotune.com/tech_articles/base_timing_how_to.htm

What to do if the engine doesn't start

To prevent flooding the engine with fuel, it's possible to press on the gas pedal at the maximum when you turn the key on and during cranking. This activates the flood clear mode and completely stops fuel injection. You can also edit the **Required fuel** to **0** in **Basic/Load Settings**, **Engine and Sequential settings**. This will completely disable gas injection at all time.

1. Ensure that the **Crank** and **Cam** synchronization is good. The Synced indication in TunerStudio will turn green while cranking.
2. Ensure that the spark plugs are firing and you can check the timing while cranking.
3. If the engine seems like it wants to start, you can try to slightly press on the accelerator pedal to see if it helps. If the engine starts this mean that fine-tuning is required for startups.

Connectors

Expansion connector

This connector contains the access to all the inputs and outputs to add more functionality to the MS3Pro-PNP. This is the view of the connector on the ECU. Note that the numbers are also noted on the connector plug. See Inputs and Outputs section for more information about the functionality of each pin.
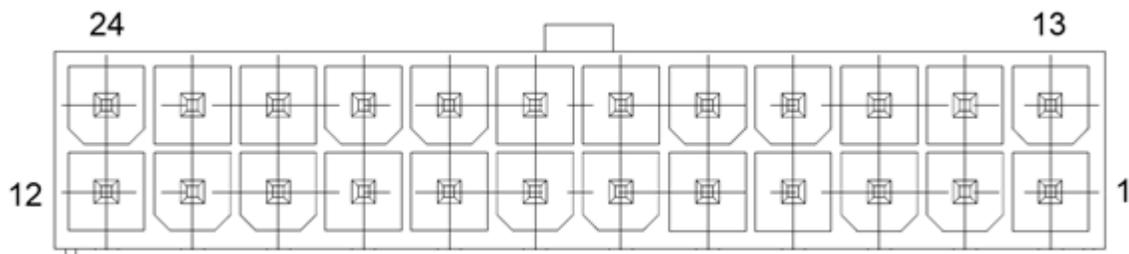
Description of the inputs and outputs pins.

	Name	Description
1	PGND	Power Ground.
2	Spark G	Spark G output.
3	Spark H	Spark H output.
4	PWM3	PWM 3 Ground Output 3A max
5	PWM2	PWM 2 Ground Output 3A max
6	PWM1	PWM 2 Ground Output 3A max
7	CAN H	CAN bus network +
8	CAN L	CAN bus network -
9	SGND	Sensor Ground. Do not connect this to engine ground
10	AIN3	Analog input 3, 0-5v
11	AIN2	Analog input 2, 0-5v
12	Wideband	0-5v wideband input signal if no internal wideband controller is used. Wideband output for an external gage if the internal wideband controller is used.
13	Spark D	Spark D output.
14	Spark E	Spark E output.
15	Spark F	Spark F output.
16	INJI	Injector output «I» 5A.
17	INJJ	Injector output «J» 5A.
18	DI1	Digital input 1 ground activated.
19	DI2	Digital input 2 ground activated.
20	DI4	Digital input 4 12v activated.
21	VR DFIN2-	VR#2 negative input
22	VR DFIN2+	VR#2 positive input or direct connection to Digital frequency input 2 depending on the jumper position inside the MS3Pro-PNP.
23	VR DFIN3-	VR#3 negative input
24	VR DFIN3+	VR#3 positive input or direct connection to Digital frequency input 3 depending on the jumper position inside the MS3Pro-PNP.

Wideband connector and controller

The internal wideband Bosh LSU 4.9 controller is optional. To know if the controller is present inside your MS3Pro-PNP, look at the serial number sticker on the back of the MS3Pro-PNP. When the controller is present, the provided wideband sensor will connect directly to this connector and will output a 0-5v signal on the expansion connector pin #12; 0v = 10 gasoline AFR and 5v = 20 gasoline AFR.

If the internal wideband controller is not installed, it's possible to use any external wideband controller that output a 0-5v signal on the expansion connector pin #12.
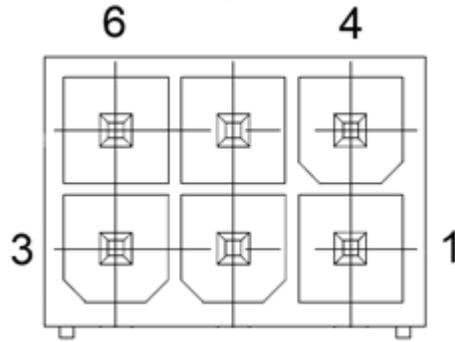
Pin description

Pin	Function	Perfect Tuning wideband sensor.
1	LSU_W	White
2	LSU_Y	Yellow-Green
3	LSU_GR	Green
4	12v	Brown, 12v 3A fused output
5	LSU_BK	Black
6	LSU_R	Red

Inside the case, there is a small jumper that allows selecting if the MS3Pro-PNP needs to read the signal from the wideband connector pin #12 or the signal on the factory oxygen sensor (O2).

How to crimp a wire for the expansion or wideband connector without the right crimper.

1. Strip the wire like the picture:
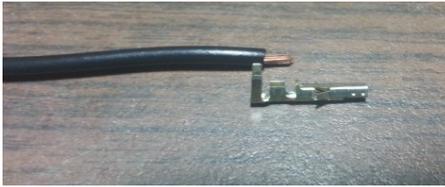
2. Insert the wire into the connector:

3. With long-nose pliers fold the small edges.

4. Then fold the long edges:

5. After the connector should look like this:

6. Add a little bit of solder to the connector to ensure it will hold forever. After that you can use this crimp in the expansion connector.

USB Connector

Connector used to interface the MS3Pro-PNP with an USB "B" male type cable. Remember: only one connection at the time to the MS3Pro-PNP (USB, serial, Bluetooth, WiFi). A reboot might be required if you change the connection method while the MS3Pro-PNP is powered.

Serial Connector

Connector used to interface the MS3Pro-PNP with a DB-9 serial cable. Remember: only one connection at the time to the MS3Pro-PNP (USB, serial, Bluetooth, WiFi). A reboot might be required if you change the connection method while the MS3Pro-PNP is powered.

Inputs and outputs

List of inputs and outputs

Here are all the inputs and outputs for the MS3Pro-PNP that you will use in TunerStudio settings.

I/O	MS3Pro-PNP Module pin name	Location in the MS3Pro-PNP
Input	Digital Switched In 1	Expansion connector pin #18. Ground activated.
Input	Digital Switched In 2	Expansion connector pin #19. Ground activated.
Input	Digital Switched In 3	Factory ECU connector pin "A/C". Ground activated.
Input	Digital Switched 12v In	Expansion connector pin #20. 12v activated.
Input	Analog Input 1	Barometric sensor inside ECU.
Input	Analog Input 2	Expansion connector pin #11. 0-5v input.
Input	Analog Input 3	Expansion connector pin #10. 0-5v input.
Input	Digital Frequency In 1	Factory ECU connector pin "SPD" (Speed sensor)
Input	Digital Frequency In 2	Depending on the internal jumper position, this input is connected to the expansion connector pin #22 or the VR2 output conditioner chip. See the "Extra VR sensors conditioner" section for more information.
Input	Digital Frequency In 3	Depending on the internal jumper position, this input is connected to the expansion connector pin #24 or the VR1 output conditioner chip. See the "Extra VR sensors conditioner" section for more information.
Output	TachOut	Control factory ECU connector pin NEO output.
Output	PWM 1	Expansion connector pin #6.
Output	PWM 2	Expansion connector pin #5.
Output	PWM 3	Expansion connector pin #4.
Output	High current output 1	Factory ECU connector pin S1.
Output	High current output 2	Factory ECU connector pin S2.
Output	High current output 3	Factory ECU connector pin OCV- to control the VVTI.
Output	Injector A	Factory ECU connector pin "#10".
Output	Injector B	Factory ECU connector pin "#50".
Output	Injector C	Factory ECU connector pin "#30".
Output	Injector D	Factory ECU connector pin "#60".
Output	Injector E	Factory ECU connector pin "#20".
Output	Injector F	Factory ECU connector pin "#40".
Output	Injector G	Factory ECU connector pin "ACMG"
Output	Injector H	Factory ECU connector pin "W" to control check engine light
Output	Injector I	Expansion connector pin #16
Output	Injector J	Expansion connector pin #17
Output	IAC1A	Factory ECU connector «ISCV valve»
Output	IAC1B	Factory ECU connector «ISCV valve»
Output	IAC2A	Factory ECU connector «ISCV valve»
Output	IAC2B	Factory ECU connector «ISCV valve»

Other	CANH	Expansion connector pin #7
Other	CANL	Expansion connector pin #8
Output	Spark D	Expansion connector pin #13
Output	Spark E	Expansion connector pin #14
Output	Spark F	Expansion connector pin #15

Injector outputs

MS3Pro-PNP can only drive high impedance injectors with a maximum of 5 amperes per channel with thermal shutdown protection. If you are running low impedance injectors, you need to use a resistor box (contact Perfect Tuning) or peak and hold driver board. Unused injector outputs may be used as general purpose ground activated outputs.

Ignition (spark) outputs

MS3Pro-PNP use 5v logic level to drive an external ignition module or logic level coil packs. Do not connect ignition outputs directly to the negative terminal of an ignition coil. This will damage the MS3Pro. We recommend the 6 channel igniter module (see Accessories) to drive directly coils. Maximum current is 200mA per channel. Unused ignition outputs may be used as general purpose outputs.

Wasted Spark to Full Sequential Ignition Conversion

The advantage of this conversion allow to run coil on plug like the 1zzfe pen coils, GM LQ9 (D585) coils and get rid of the factory 3 channel igniter. Only smart coils can be used. Cylinder #1 is the one on the front of the engine near the radiator.

When wiring is done, open TunerStudio, click on **Ignition Settings**, **Ignition Options / Wheel Decoder**, and verify that **Number of Coils** is set to **Coil on plug**. Verify timing again after that.

A/C Control

The MS3Pro-PNP is connected to the A/C input and this input is connected to the "Digital Switched In 3".

To enable it, go to the "**Startup/Idle**" menu in Tuner Studio and then go to **Air Conditioning Idle-up** menu.
The **Idle-Up Output** needs to be set to "**Injector G**". This is to control of the A/C compressor clutch.

Knock sensors inputs

The factory knock sensors are connected to the MS3Pro-PNP. To try this option, you need to enable it in Ignition **Settings**, **Knock Sensor Settings, Knock Control** and **set Input type** to **Internal**. This feature should be used for safety and not for tuning.

1JZ-GTE bore = 86mm and resonance frequency = 6.7 kHz.

For more information, refer to the MS3Pro user manual.

Bypassing the fuel pump ECU controller

With the MS3Pro-PNP it's possible to bypass and control the stock fuel pump directly with an automotive relay. This is required if the original wiring cannot handle the current of an upgraded fuel pump or multiple pumps.

The Fuel Pump output pin is available on the expansion connector pin 3.

Refer to the MS3Pro user manual for more information about the wiring and configuration of a fuel pump with a fuel pump relay.

Launch control / Flat-Shift / 2-step / Antilag

Use any **Digital Inputs** from the expansion connector. Connect this pin to ground to enable the launch control with a clutch switch or a push button after enabling the function in the **Advanced Engine** menu.

Here is a configuration example:
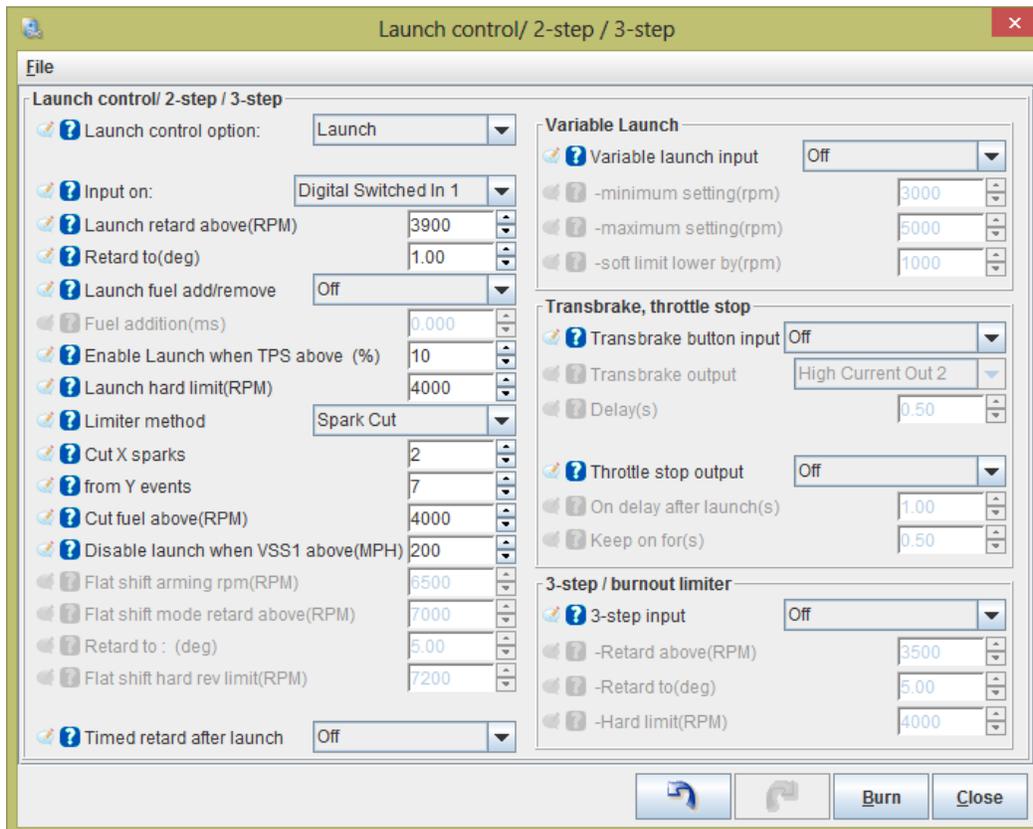
For more information on this option, refer to the MS3Pro user manual.

LED indicators

- Red LED: This red led indicate that there is 12v power on the MS3Pro.
- Green LED: Connected to the Fuel pump relay output of the MS3pro.

Extra VR sensors conditioner circuits

The MS3Pro-PNP also includes two extra variable reluctance conditioner circuits. The 2 circuits are useful to monitor 2 wire ABS sensors, or any 2 wire shaft speed sensors. They are connected to "Digital Frequency Input 2" and Digital Input Frequency Input 3".

The conditioner circuits are the same as the crank and cam conditioners.

There are four (4) jumpers (2 for each input) inside the MS3Pro-PNP that are used to route the signals to the VR conditioner circuits or directly connected to the Digital Frequency Input.

If both jumpers are on the left in the red circle (see image below), at the VR position, it means that the pin on the expansion connector #22 will be connected to the VR circuit. If the jumper is on the right, this means the expansion connector pin #22 will be connected directly to the "Digital Frequency Input 2". The expansion connector pin #21 named "VR DFIN2 –" is normally connected to the second wire of the VR sensor.
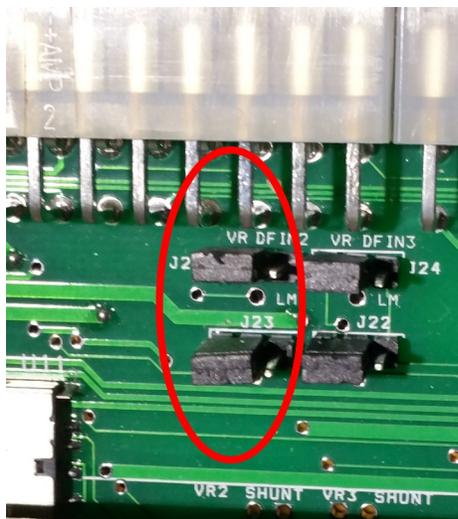
And this is the same thing for the expansion connector pin #24 with the "Digital Frequency Input 3. The expansion connector pin #23 named "VR DFIN3 –" is normally connected to the second wire of the VR sensor.
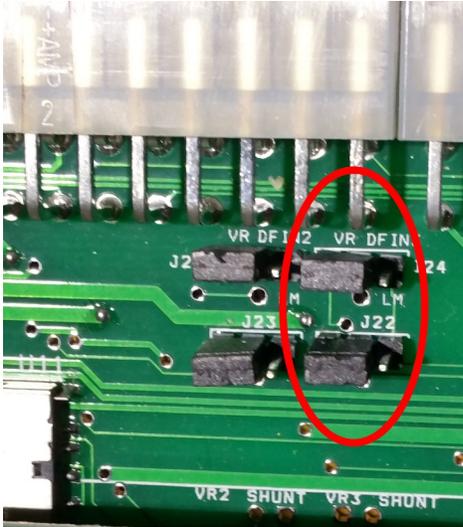
Internal Bluetooth module

The MS3Pro-PNP has an internal Bluetooth module inside for wireless communication.

The Bluetooth module is powered by the #1 red switch on the back. To enable Bluetooth module, slide the switch #1 to the ON position. To use the Bluetooth module, you need to pair with the module called PERFECT_TUNING_MS3PNP and enter the password 1234.

Note that in every situation **only one** connection to the MS3Pro-PNP can be made at the same time (one device, with serial, USB, Bluetooth, WiFi).

Internal WIFI module

The MS3Pro-PNP can have an internal WIFI module for wireless communications. This module is optional. To see if the MS3Pro-PNP is equipped with the WIFI module, look at the serial number tag on the back. To power up the WIFI module, slide the red switch #2 to the ON position. A new WIFI hotspot named **PerfectTuningMS3ProPNP** will appear and the password is : "12345678" without the quotes. The IP address is 192.168.4.1 and the port is 8080.
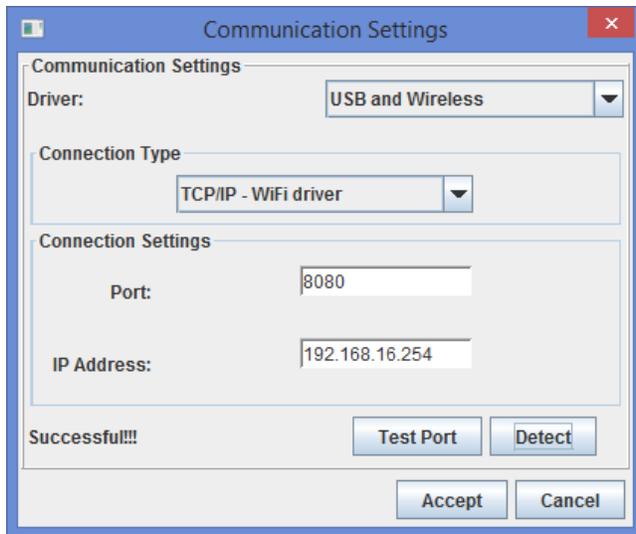
Internal Data logging on SD Card

An 8GB SD card is included with each MS3Pro-PNP. It is possible record many days of logs in this internal memory. All logs are time stamped so it's easy to find the right data log of a specific moment.

The SD card is removable for faster downloading of the logs. It's also possible to browse the SD card with TunerStudio but it takes more time to download all the logs.

Internal MAP and Barometric sensor

There is a 4 bar (44 psi of boost maximum) MAP sensor inside the MS3Pro-PNP. To use the internal map sensor, a vacuum hose need to be installed from the intake manifold to the fitting on MS3Pro-PNP. The internal sensor uses the MPX6400 configuration.

The barometric sensor is inside the MS3Pro-PNP enclosure and use the MPX4115 configuration.

Next step is to configure the MAP in Tuner Studio. Go to **Tools**, **Calibrate MAP/Baro**.

Select **Custom** in **Common MAP sensor**.
Value at 0v = -38.2
Value at 5v = 220.0

Internal Bosch LSU 4.9 wideband controller (optional)

The MS3Pro-PNP include an internal Bosch 4.9 wideband controller (optional) to be used with the Bosch wideband sensors. To see if the wideband is included in your MS3Pro-PNP, refer to the serial number sticker on the back of the ECU.

The provided sensor with 6-foot cable is plug and play in the 6 pin wideband connector on the side of the ECU.

If the internal wideband controller is installed, the expansion connector pin #12 will output a 0-5v signal (0v = 10.0 AFR, 5v = 20.0 AFR). It's possible to connect an external gage to this signal.

The WB jumper inside the ECU needs to be in the WB position.
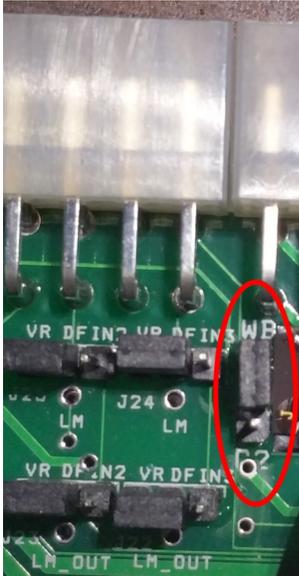
Internal Real Time Clock

The RTC module (real time clock) is used to assign a timestamp to all the logs on the SD card. The module uses a CR1220 that is included and installed in the MS3Pro-PNP. This battery is designed to last many years.

Traction Control

The MS3Pro-PNP includes many types of traction control algorithm. More information is available in the MS3Pro user manual.

If your car is equipped with ABS system, it's possible to tap the front and rear wheel speed sensor signal to the MS3Pro-PNP. The front wheel ABS sensors on a MKIII Supra are VR sensors. The signal needs to be connected to the Extra VR sensors circuits on the expansion connector and the signal front the rear wheel comes from the sensor inside the transmission which is a hall sensor (can be connected directly to a digital input).

Boost Control

Connect the boost control valve to any of the PWM outputs or injector "I" or "J" outputs.

The MS3-Pro has multiple boost control strategies. Refer to the MS3Pro user manual for more information.

Refer to www.perfecttuning.net for an electric boost solenoid.

VVTI

The MS3-Pro can control up to 4 variable cam gears. On the 1JZ-GTE VVTI, there is only one on the intake side. Controlling the VVTI allow a better low rpm torque and turbo spool. If the VVTI is not controlled, the engine will run perfectly fine without the advantages of it.

Electronic controlled automatic transmission.

The MS3Pro-PNP do not control the automatic transmission and work only for manual transmissions. It's possible to add an MSShift controller to control the transmission. Contact us for more details.

Base map

All MS3Pro-PNP comes with a default base map that is able to start and run your engine but tuning will be required.

12 Month Limited Warranty

Perfect Tuning warrants to the consumer that all products will be free from defects in material and workmanship for a period of twelve (12) months from date of the original purchase. Products that fail within this 12-month warranty period will be repaired or replaced at Perfect Tuning's option, when determined by Perfect Tuning that the product failed due to defects in material or workmanship. This warranty is limited to the repair or replacement of the Perfect Tuning part. In no event shall this warranty exceed the original purchase price of the Perfect Tuning part nor shall Perfect Tuning be responsible for special, incidental or consequential damages or cost incurred due to the failure of this product. Warranty claims to Perfect Tuning must be transportation prepaid and accompanied with dated proof of purchase. This warranty applies only to the original purchaser of product and is non-transferable. All implied warranties shall be limited in duration to the said 12-month warranty period. Improper use or installation, accident, abuse, unauthorized repairs or alterations voids this warranty. Perfect Tuning disclaims any liability for consequential damages due to breach of any written or implied warranty on all products manufactured by Perfect Tuning. Warranty returns will only be accepted by

Perfect Tuning when accompanied by a valid Return Merchandise Authorization (RMA) number. Product must be received by Perfect Tuning within 30 days of the date the RMA is issued. Oxygen sensors are considered wear items and are not covered under warranty. Please note that before Perfect Tuning can issue an RMA for any electronic product, it is first necessary for the installer or end user to contact the us at support@perfecttuning.net to discuss the problem. Under no circumstances should a system be returned or a RMA requested before the above process transpires. Perfect Tuning will not be responsible for electronic products that are installed incorrectly, installed in a non-approved application, misused, or tampered with. Any Perfect Tuning electronics product can be returned for repair if it is out of the warranty period. There is a minimum charge of $50.00 for inspection and diagnosis of Perfect Tuning electronic parts. Parts used in the repair of Perfect Tuning electronic components will be extra. Perfect Tuning will provide an estimate of repairs and receive written or electronic authorization before repairs are made to the product

MS3Pro-PNP dimensions

185mm X 159mm X 38mm (7 ¼ x 6 ¼ x 1 ½ inches)

Contact

If you have any issues, or questions, you can take a look on the forum at www.msextra.com read the MS3Pro user manual at: www.ms3pro.com/downloads.html or contact me at support@perfecttuning.net. I can give remote desktop and phone support. Just contact me by email first.

Accessories:

Please visit http://perfecttuning.net for more information.

- Wideband Bosch LSU 4.9.
- Fast response GM intake air temperature sensor (open element IAT)
- GM intake air temperature sensor or coolant temperature sensor (close element).
- Exhaust gas temperature sensor. Up to 1250 Celsius with interface board.
- USB-Serial cable for a computer or an Android device.
- Resistor box for low impedance injectors
- 6 channel igniter box to direct drive coil packs.
- Boost control solenoid valve.

Visit http://perfecttuning.net for more information or contact us at support@perfecttuning.net.