

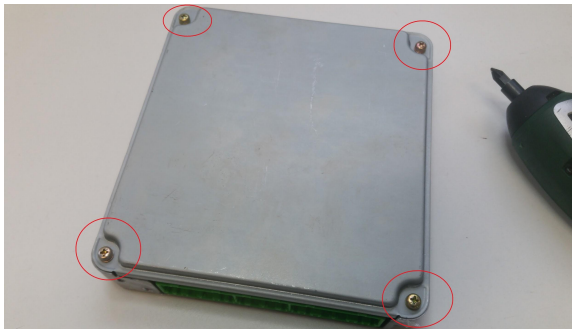
Motorsport Electronics Limited

Miata NB (99-00) '3 Plug Mk2' PnP ECU

Hardware Installation Guide

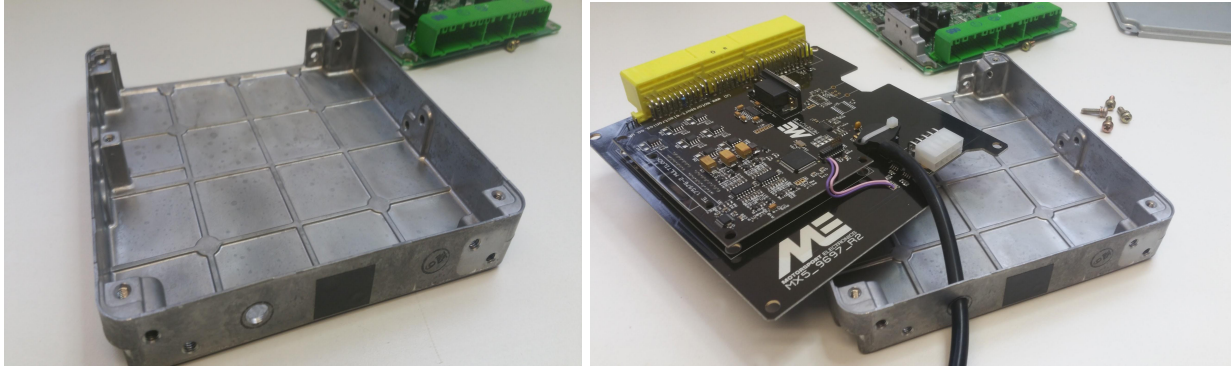
Please ensure you work in safe, well lit environment. Electrostatic Discharge could damage the ECU so be sure to ground yourself when working with electronics.

1. First, disconnect the battery from the car, then pull back the carpet in the passenger footwell to expose the ECU cover plate.
2. Remove the ECU Cover Plate and disconnect the Engine harness from the factory ECU.
3. Next undo the ECU retaining brackets from the car by loosening the three 10mm Bolts. These can sometimes be security bolts which will need to be drilled out.
4. You may need some snips at this point to cut any cable ties used to retain the loom - remove the ECU from the car.
5. Now, remove the 4 cross-head screws highlighted in the picture below, and remove the cover, exposing the ECU internals as shown, then remove the single screw that holds the PCB in position:



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7. Now remove the old PCB from the ECU's chassis (*you may wish to keep this PCB if you ever wish to return the ECU to stock*), and drill a 10mm hole in the rear of the case to allow fitment of some silicone hosing from the ECUs on board MAP sensor to the intake manifold:



8. Now set the FPump/Immobiliser jumper on the PCB to bridge either 'No Immob' (and the centre pin) or 'Immob' (and the centre pin) depending on if it is a UK or Import Car. If in doubt, you can try both. This is required for the fuel pump to run. If you cannot hear the Fuel Pump Prime with the key on then try the other setting. This is the main reason cars do not start straight away - LISTEN FOR THE FUEL PUMP!!

9. Next, flip the PCB over and refit the lid. Note you do not need to reinstall the PCB securing screw removed earlier, as the PCB is held in place by the cover screws.



Note that you can also modify the casing to allow an RS232 cable to be permanently affixed to the ECU - or simply only install the casing after tuning is completed. Note that the ECU by default is loaded with an accurate OEM basemap.

At this point the ECU is able to be reinstalled on the vehicle with the top cover left unfitted to allow for a laptop connection for tuning. However, if you plan to take the vehicle to a tuning centre, then both cover plates can be refitted until that time.

Now refit the ECU to the vehicle as originally fitted, reconnect the battery, and turn the key... The engine should start, idle, and drive as before on the supplied basemap.

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Bare in mind basemaps are provided without warranty - so if you have a modified engine it is best (and we always recommended in any case) that you take the car to your nearest rolling road for checking/tweaking as required. Failure to do so may damage your engine.

Plumbing the on-board MAP Sensor

The ME221 MX-5/Miata PnP features a 21psi on-board MAP sensor that is used when running supercharged or turbocharged engines. Its fitting is a 3mm barb. Use 3mm ID silicone vacuum hose and run it to the inlet manifold AFTER the throttle. You can drill a 10mm hole in the case and use a grommet to pass it through the OEM casing neatly.

Fitting an IAT Sensor

If you turbo/supercharge the car you will need to relocate the factory IAT sensor to nearer the throttle body AFTER any charging stages. Extend the wires as required.

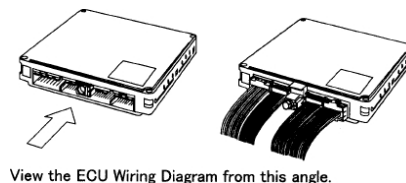
Boost Control

For the MX5 PnP, the boost control signals are brought to the two wires that run the OEM 'purge solenoid' under the bonnet (Pin 3L on the ECU). Simply extend the wires and replace this solenoid with a standard MAC/3 Port Boost Control solenoid plumbed into your turbo housing -> wastegate vacuum line, and then use the boost control settings in the MEITE to configure closed or open loop boost control. The wiring polarity does not generally matter.

A boost control kit is also now available from the ME online store.

Wideband Lambda O2

If you wish to use wideband O2, use an external controller such as the ME_WBO2_PRO controller, or any system that outputs a 0-5v signal. Connect this either to the original Lambda/O2 signal line going into the OEM connector (Pin 2C, Blue Wire on the ECU), or into one of the unused analog channels, and be sure to select the WBO2 signal source in the Input configuration driver from within the MEITE, and also set its HRT table correctly to match your chosen controller's output. Most (including the ME_WBO2_PRO) give 0v=10:1, 5v=20:1 AFR.



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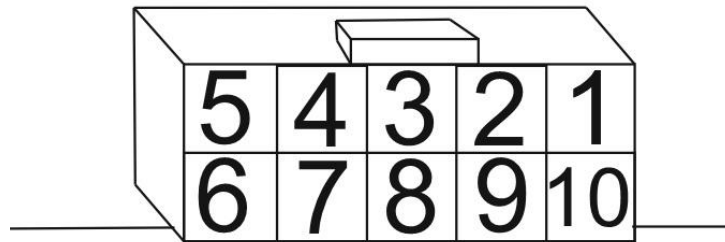
1U	1S	1Q	1O	1M	1K	1J	1G	1E	1C	1A	2D	2M	2K	2J	2G	2E	2C	2A	3Y	3W	3U	3S	3Q	3O	3M	3K	3J	3G	3E	3C	3A
V/Y	L/B	BR/R	GY/R	*	*	L/W	BR	W/L	*	L/R	P/B	V	G/O	LG/R	*	R/L	L	R/G	Y/R	Y/B	L/O	GRY	W/L	V/R	O	BR/B	BR/W	BR/Y	G/B	B/L	B/Y
V	GRY	R/G	LG/B	*	BR/Y	*	G/R	G	G/W	W/R	P	W/G	LG/B	GY/R	GY/L	W	W/B	P/L	Y/G	V/G	R/Y	G/Y/B	*	*	LG	BR/R	R	BRN	B/R	*	B/Y
1V	1T	1R	1P	1N	1L	1J	1H	1F	1D	1B	2P	2N	2L	2J	2H	2F	2D	2B	3Z	3X	3V	3T	3R	3P	3N	3L	3J	3H	3F	3D	3B

(COLOURS OF WIRES MAY VARY)

Motorsport Auxiliary Port ('MAC' or AUX PORT)

On the baseboard is the 10 Way AUX PORT (pictured below) that allows connecting of other sensors, switches, as well as 2x Low Side Drivers that can drive up to 6A each. These spare inputs/outputs can be configured to any function in the ME221's input/output settings drivers - though please refer to the ME221 software manual available from our website (www.motorsport-electronics.co.uk) as this guide refers only to the hardware connectivity.

The AUX/MAC PORT pinout is shown below, and is standard across all our PNP ECU range:



Note the above is of the Connector on the PCB 'looking at the pins'.

Pin #	Function/Notes
1	GROUND (ADC Referenced and LOW Current Ground Return)
2	5V Reference :: 50mA MAX
3	NC
4	AUX/MAC-LS2 :: Low Side Driver - 6A Max
5	AUX/MAC-LS1 :: Low Side Driver - 6A Max (useable with firmware version >2.1 only)
6	AUX/MAC-Digital Input 1 :: Pulled high to 5V. Use 10K resistor in series with switch to GROUND.
7	NOT CONNECTED
8	AUX/MAC-Digital Input 2 :: Pulled high to 5V. Use 10K resistor in series with switch to GROUND
9	AUX/MAC-Analog In :: Protected 0-5V Analog Input.

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10	AUX/MAC-Digital Input 3 :: Pulled high to 5V. Use 10K resistor in series with switch to GROUND
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AUX/MAC PORT CONTINUED...

Please note the following:

1. The Low Side drivers can handle up to 6A each continuous.
2. All Digital Switches are pulled high to 5V. They require a switch to ground in order to work. They also require a 10K resistor in series to help protect the port from accidental over-voltage/noise.
3. The 5V output should have no more than 50mA current draw - it is generally used as a low current VREF line only. It is ON with the ignition.
- 4.
5. The AUX_ADC line is designed for 0-5V, and is over and under voltage protected.

The wiring connector part numbers are shown below:

-Connector: Molex 39-01-2100

-Pins: Molex 39-00-0078 (You will need 9 of these)

A good source is RS Online for these parts.