Make sure to read the document that comes with the GMPP engine wiring harness. It has everything you need to know that’s not Miata specific! Also, consider that Mazda engine harness wires & plugs that go to removed parts should be discarded / safely taped up so they won’t short out or melt. This includes AFM/MAF plugs, coil/igniter plugs, relay wires etc.. It is highly recommended that you procure a complete wiring diagram for your year Miata. If you’re using a salvage harness you will also need the factory diagram from the native car so you can sort all this information out. Bear in mind that we’re familiar with what we use – we use new parts, so we won’t be of much help with wiring if you start with a salvage harness. We have the diagrams for the GMPP PCM & harness, email us the request if you need them. Clean all ground connections! Loom & tie wrap all wires that could be damaged from hot or sharp things!

These instructions are a work in progress, so there are some notes about old and new things – that which we’ve already tried, and that which we’re assuming will be better. Any new / unproven ideas are red.

Wiring at the back of the Mazda instrument cluster can be found as follows. Plug 1 is white, plug 2 is black, and plug 3 on 99-05 cars is small white.

Tachometer mod. The Miata tachometer is expecting a different voltage input than the GM ecu puts out, so we need to fool it. A 2200 ohm (2.2K) resistor needs to be jumpered in between switched 12 volts (Mazda 12v wire listed below) and the tachometer input lead (white wire in GM bulkhead connector) going from the GM harness to the Mazda instrument cluster. The white GM wire will connect to the Mazda tach wire going in to your instrument cluster (below). The 12v -> 2200 ohm resistor -> will “T” into this tach wire. An easy way to visualize it is to just think of the 2200 ohm resistor as a jumper wire between the 12v wire and the tach wire where it plugs into the instrument cluster. Make sure you cover the resistor with heat shrink tubing to protect it from shorting! What you’re doing here is “pulling up” the tach signal voltage so the Mazda tach can read it.

- **90-93**: 12v is 2K black/yellow, tach is 1H yellow/blue.
- **94-97**: 12v is 2K black/yellow, tach is 1H black/white.
- **99-05**: 12v is 1C black/yellow, tach is 2K green/orange.

Abbott speedo box (1990-1997). The unit comes with detailed instructions for wiring & calibration. The GM harness has a plug that connects to the VSS output on your transmission. This twisted pair will run back to plug 3 at the PCM where they pin in next to each other. At some convenient spot you’ll want to T the purple/white VSS wire & run it to the Abbott box where it will connect to the white wire. This way both the PCM & the Abbott box get the signal. Power for the box can come from the white/red wire in the now defunct Mazda diagnostics connector. Ground for the box can come from the black wire in the same diagnostics connector. (The rest of the diagnostics connector can be discarded.) Make sure to mount the unit somewhere that the mechanical cable will reach your instrument cluster without any stress or kinks!

Calibration can then be done according to the Abbott instructions with a co-pilot and a GPS. To do the initial calculations, you’ll need to know your differential ratio, the revolutions per mile of your tires, and the
number of teeth on the transmission exciter gear - on the T56 it is 17. The formula is ((teeth on transmission gear) x (rear axle ratio) x (revs per mile of your tires) x .267). You'll use this number to find the correct dip switch sequencing in the supplied manual, and then confirm / modify it with feedback from a GPS. Note: The GMPP PCM (except the E-Rod) is expecting a 40 tooth auto-trans input, but your dyno tuner can fix this.

**Dakota speedo box (1999-2005).** The GM harness has a plug that connects to the VSS output on your transmission. This twisted pair will run back to plug 3 at the PCM where they pin in next to each other. At some convenient spot you'll want to T both these wires & run a twisted pair to the Dakota box. This way both the PCM & the Dakota box get the signal. At the box, run the purple/white VSS wire to the input of the Dakota box. For sensor ground run the light green/black VSS wire to the Dakota box. For switched power use the pink wire in the GM bulkhead connector. For chassis ground use a ring terminal to chassis ground. Finally, cut the 2M orange speedo signal wire going to the back of the instrument cluster and run the instrument cluster side to Out 3 on the Dakota box.

*Let's Try Alvin's setup next time* -jmf

To start, you have to do a “quick preset”, by setting dip switches 1, 2 and 4 off, 3 on, then holding both up and down buttons on while you turn the key on. Now turn #2 & #4 back on (so you end up with 1 off, 2-3-4 on). At this point, you can plug the connectors back into the cluster and go for a ride with your co-pilot and GPS. You just hold the up or down buttons on to match the speedo to your GPS. You may need to hold the button for several seconds before you see things start to change. Once you have it set, tidy up your wiring, stash the box behind the cluster, and button things up.

**Mazda oil pressure (dash) sending unit.** Install the Mazda oil pressure sending unit on the back of the LS engine using an adaptor. The GM harness has a lead for oil pressure with 3 wires. We’ll only be using the tan/white wire- the other two should be secured where they can’t short out. Attach the tan/white wire to the sending unit. Then, inside the car, you’ll pull the tan/white wire from the GM bulkhead connector & run it to the oil pressure wire at the back of the instrument cluster.

- 90-97: 2B yellow/red
- 99-05: 3E yellow/red

**Mazda water temperature (dash) sending unit.** The GM PCM uses a water temp sensor that comes in the head of your engine close to cylinder 1. It will signal the GM PCM through the GM engine harness. You can use the Mazda water temp sending unit to drive the dash temp gauge by unplugging the water jacket hole on the head by cylinder 8. 90-97 sending units will attach using an adaptor (you’ll have to drill it out a bit to fit) while 99-05 sending units will screw right in. Run the signal wire to the wire that comes out of the back of your instrument cluster as follows.

- 90-97: 2L black/blue. Sending unit is a 1/8 NPT single wire spade.
- 99-05: 2A violet/white. Sending unit is a 3 wire sensor, but you only need V/W for the dash gauge.

**Check engine light / Malfunction Indicator Lamp.** The GM fuse block has a MIL lamp, but you may as well also hook it up to the CEL on your instrument cluster. In the GM bulkhead connector it is the brown/white wire. Hook it up to the following CEL wire coming out of the back of your instrument cluster.

- 90-97: 1C yellow/black
- 99-05: 2O white/blue

**Note:** Starting in 2001 cars had an immobilizer, which will no longer function post-conversion. However there will now be a “blinky key” light on your dash. The solution is simply to remove the bulb.

**Fuel Pump.** The GM fuse box already has a heavy gauge relayed 12V wire coming out of it for the fuel pump. Wire this to the 12V side of the fuel pump (below). The other side of the fuel pump (black wire) already goes to chassis ground. The Mazda fuel pump relay & wiring can be removed. **Note 1- we**
recommend the DW300ph fuel pump & have kits for 1990-05 cars. **Note 2-** For 1999-05 cars you will need to remove the factory fuel pressure regulator that’s on the return tube inside the fuel tank (on the pump housing assembly). The Vette fuel filter has a built-in pressure regulator.

- 90-97: blue/red
- 99-05: red/blue

**Backup lights.** Take the 2 wires from the backup switch on your T56 & splice them into the black/yellow and the [90-97 red/green] / [99-05 red/yellow] reverse light wires in the Mazda harness. The polarity doesn’t matter.

**Reverse lockout.** Grab the two wires from the T56 reverse lockout switch. One wire will T into the green wire going to the brake lights. The other wire will go to chassis ground. **that said** We’ve decided to fabricate the reverse lockout solenoid into a mechanical device, instead of an electronic one, in order to solve any issues with the lockout working intermittently.

**Alternator.** The white heavy gauge wire that went to the Mazda alternator post needs to be lengthened & then bolted to the big post on the GM alternator. The single signal wire that plugs into the alternator is part of the GM engine harness. In order for your battery light to work on the dash, you’ll want to T into this GM signal wire and run it to the following wire going into the back of your instrument cluster:

- 90-97: 1G white/black
- 99-05: 3B brown/red

Also, for NB cars that have the GM relay box on the rail behind the driver’s side headlight you can take your main B+ right from the alternator post to the post on the box.

**Let’s Try the 8ga wire & connectors next time** -jmf

**Starter.** The Mazda wires that went to the Mazda starter will go to their same respective places on the GM starter. Our kits provide a pigtail for the solenoid wire.

**Ground Strap.** Fabricate a ground strap from 4ga wire. (Same stuff you’re running from B+ to the GM fuse box.) Run it from the engine block to chassis ground.

**Ignition Switch.** There’s a pink wire in the GM engine harness labeled “ignition switch”. This needs to see switched 12V in order to power up the GM PCM. You can T this into a switched 12v source from the Mazda ignition switch- this is the blue wire coming out of the switch on all years, except 1999-00 which is red/ black. If you’d like a hidden kill switch you can put it on this wire.

**Charcoal Canister.** The GM Performance ECU does not control an evaporative emissions purge system for burning fumes that come through the charcoal canister *unless* you are installing an E-Rod system. Therefore the associated wiring can be removed. However, we do recommend that you still run your gas tank purge through the charcoal canister before venting it to atmosphere (in the stock location) to help clean up the fumes. Make sure to safely cap off any unused ports in the canister.

For the E-Rod system we will need to simply run a hose from the under-hood Mazda charcoal canister to the port on the GM evap solenoid, installed on the GM crate engine.

**Fan and A/C wiring.** The GMPP fuse box has a light blue relayed power coming out of it ready to go straight to a single main fan if that’s all you’re running. However, most of you are running two fans & probably running A/C so we need to set this up differently. Start by removing the bottom cover from the relay box & exposing the wires. The fan relay (with that fat light blue wire coming out of it) has two wires ganged together going to the trigger side of the relay- a green & a blue wire. These are switched grounds that the PCM staggers their on/off by a few seconds which is mighty convenient for running your two fans, and keeping them staggered slightly to manage current draw. Here’s how we’ll do it.
For 1990-1993, All *(to be tested ~jmf)*
- Cut the black/green wire on the Mazda cooling fan relay and butt connect the relay end of wire to the GM green fan trigger wire. Now the GM PCM is triggering the Mazda main fan relay.

For 1990-1993, with A/C *(to be tested ~jmf)*
- Connect the light green/black wire from the switch side of the thermo-switch (on the evaporator) to the blue/black wire at the A/C relay.
- There’s already a diode in the A/C relay so no need to add one.
- Our Big Fan Kit (which you’ll want) comes with extra wiring & instructions to bring the gauge of the A/C fan wiring up to snuff, and wire the fans to run in parallel. Consult those instructions to complete that task.
- *(Not related to the relay wiring above)* The GM A/C clutch pigtail has 2 wires. The green wire goes to the Mazda A/C clutch power wire *[90-00 black/red]*, and the black wire goes to chassis ground.

For 1994-2005, All
- The green trigger wire will stay connected to the GM fan relay. The blue trigger wire will be cut & used to run the Mazda condenser fan relay. This will help spread out the current draw.
- Run the fat light blue power wire coming from the GM fan relay to the power side of your main fan. For the ground side of your main fan, you can either use the factory ground wire or run a new wire direct to chassis ground if your old wire looks corroded or beat up.
- The Mazda cooling fan relay will no longer be used since the GM relay is running the main fan. Pull the relay out.
- Cut the *[90-05 blue/white]*, *[06-12 red/white]* wire from the Mazda condenser fan relay and butt connect the relay end of wire to the GM blue fan trigger wire (the one you snipped earlier). *Leave one side un-crimped for now if you have A/C, see below.* Now the GM PCM is triggering the Mazda condenser fan relay. Make sure to check / clean up / replace the factory fan ground wire as necessary.
- **Note:** On MSMs there are two condenser fan relays & the blue/white trigger wire is ganged between them. You want the wire that would have gone direct to the Mazda PCM, it’s on the relay with the light green/black wire.
- If you have a 04-05 MSM & you’re wiring in aftermarket fans, you’ll be switching from a low speed / high speed stock setup to a 1 fan / 2 fan setup (like all other Miata’s). Since the GM relay is running the main fan direct that one is easy. On the condenser fan, we’ll only be using 2 of the 4 wires in the plug. So, on the condenser fan connect the power wire to the light green/black Mazda fan wire, and the ground wire to the black Mazda fan wire. Make sure to safely tape up the remaining wires.

For 1994-2005, with A/C
- Cut the light green/black wire on A/C high pressure switch (on the aluminum A/C tube). Attach the switch side of the cut wire to the stripe side of a diode. Attach the other side of the diode to the blue/black trigger wire at the A/C clutch relay. *Don’t crimp this side yet, see below.* Now when you press the A/C button it triggers the AC clutch relay directly, and the diode is in-line to prevent back-feeding.
- You must now run a jumper wire with another diode teed between the blue/white trigger wire at the condenser fan relay & the blue/black trigger wire at the AC clutch relay. Install the diode such that the stripe faces the clutch relay. You may now crimp the two that you were leaving for the T connection. Make sure to protect all diodes from shorting. Now the fan will come on with the clutch, but the clutch will not come on with the fan.
- *(Not related to the relay wiring above)* The GM A/C clutch pigtail has 2 wires. The green wire goes to the Mazda A/C clutch power wire *[90-00 black/red]* *[01-05 black/yellow]*, and the black wire goes to chassis ground.