



# at MotorSport Ranch II

Saturday and Sunday, March 17 and 18, 2001

## Preparing your Miata

This information includes suggestions for preparing your Miata for an enjoyable and reliable weekend at the track. We will start with normal maintenance items that should be looked at prior to the event, followed by suggestions to improve the factory settings, then concluding with final preparation at the track. Although a Miata will perform VERY well just as it came from the dealership, there are certain adjustments that can make it even better. None of these are necessary for the track event at Motorsport Ranch, especially if this is your first event, but they will make the Miata handle and stop better as your skills improve.

### Maintenance items (in order of importance)

1. Check brake pad wear. Replace if necessary. Replace brake fluid completely and bleed brakes.
2. Check tires for even wear and depth of remaining tread. If the tread wear bars are visible, replace the tires. Use a quality replacement all-season or performance tire of the same type on all four corners. Typically, tires with 10-20K miles will grip better (in the dry) on the track than brand new tires. Tire pressures will be discussed later.
3. If your Miata is near the 60K or 120K mileage, make sure the timing belt is replace. If you have a 90 or early 91 Miata, make sure this is done CORRECTLY, as there is a design flaw in early crankshafts that can appear if the woodruff key is not inserted correctly.
4. Make sure the oil and filter has been changed recently.
5. The OEM spark plug wires have a tendency to fail under heavy load, especially in hot weather. This should not be a problem in March, but if your plug wires have never been changed, buy a replacement set.
6. In multiples of 30K miles, the following should have been changed: Fuel filter, Air filter, Transmission fluid, Differential gear oil, and Spark plugs. If they haven't been done or it is getting close, help your Miata out be having them done prior to the event.

### Improvements

1. As was indicated earlier, a Miata with factory settings will do just nicely on the track, BUT, if you are looking for more, here are some alignment suggestions that will make your Miata turn in quicker and stick better in the corners.

	Front		Rear	
	Camber	Caster	Toe	Toe
Stock	+0.3	4.5	3/16 toe in	-0.7
Mild	-0.5	3.5	0	1/8 toe in
Agressive	-1.0	2.5	1/8 toe out	1/16 toe in

#### Here is a quote from Merv:

First of all, let's talk about toe

**Toe IN is POSITIVE. Toe OUT is NEGATIVE.** Most cars have toe IN (in the front) and are not adjustable in the rear (unlike the Miata). Front toe in is safe, as it forces understeer. It also makes the car more stable at speed, but it's not optimum for serious, aggressive driving. Zero toe will make the car very neutral in a straight line. If you want all the speed you can get, this is it...minimum scrub. Toe out, on the other hand, generally loosens up the front end, allowing more crisp turn-in but the car skitish in long, high-speed sweepers. It requires more driver input and will generally give you the fastest cornering. In the rear, toe in keeps the rear tucked-in, while toe-out will make the car tail happy...fun, but definitely not what you want to go fast. Again, for straight line speed, zero is the way to go, BUT, the bushings flex. Under acceleration, this flex causes the rear to go slightly negative, so you need a little positive toe to end up at zero.Caster needs to be different for



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autocrossing and track events.

The numbers above are for track events. For autocrossing, just go for maximum caster. Autocrossers crank in as much caster as they can, because, in a turn, caster effectively adds camber. With slow, tight transitions, you need all the camber you can get. For track events, less caster gives you more control as you have to steer into and out of the corners. It also maintains a more linear camber than the autocross settings, which is more important in high speed corners where steering inputs should be smaller, smoother and slower. That said, let's compare alignment settings. I'm pulling the stock settings from memory, so I may be off a little. The mild settings will be better for performance driving with only slight degradation in tire wear. The aggressive settings are probably the most you will want on a street car and will wear out the tires more quickly. All of these numbers can be shuffled a little, for your driving style. Some people like more understeer, while others prefer oversteer. Hopefully the explanations will allow you to find a combination that works right for you. One other thing, the M2 has a slightly wider track and more caster from the factory. This allows the M2 to handle as well with less aggressive settings than a M1 with more aggressive settings.

2. Now that we have helped the suspension work better, let's help the tires by changing air pressure. Recommended factory tire pressures are fine for normal driving for ride and tire wear. For track events, it is necessary to increase pressures to give the sidewalls more support under high-G side loads that are experienced in the corners. Generally, the lower the profile of the tire and the wider the width, the less pressure that is needed. Suggested pressures will be with cold tires. You can expect an increase of 4-8PSI during aggressive track driving. Starting with a stock size tire of 185/60-14, we recommend 34PSI. The next common size (standard on 99 leather and sport packages) is 195/50-15, which is both shorter and wider, works well at 30PSI. A 16" wheel will need just slightly less pressure. As you go to really big wheels, the side walls get so short that the danger of rim damage overrides logic, and pressures tend to increase (no recommendations here!), the tires wear quickly in the center, and adhesion suffers.
3. Increase ignition timing to fourteen degrees. This cannot be done on a 99 and later Miata. It may be necessary to increase the octane rating of gasoline if the engine 'pings' with this change.
4. Switch to performance brake pads and high temperature brake fluid. This will cause more brake dust, and more rotor wear, but will give more consistent braking in shorter distances.
5. Change all fluid to synthetic. This includes engine oil, transmission fluid, and differential gear lube.
6. Change air filter to a free-flowing performance type.
7. Add a roll bar. This is a personal safety item, and we would recommend that anyone who is serious about driving their Miata at the limits should install one.
8. Along with a roll bar, never without one, add a 5 or 6 point harness. This prevents undesirable slipping and sliding in the seat and ultimately increasing control, not to mention the safety issues.

### **At the track**

By this time, there isn't much else to do to get ready for your track sessions, so we'll just finish up with some general stuff. Hopefully, you remembered to stop and fill up the gas tank on the way.

1. Empty the trunk, glove box, console, and cockpit of everything that isn't bolted down, including floor mats. The spare tire and jack are extra weight, so take them out also.
2. Remove the center caps on the wheels.
3. Torque the lug nuts to 80lb-ft.
4. Increase tire pressures as noted above. Air is available in each of the garages.
5. If you're driving a 99 or newer, it's a good idea to put some protective tape over the headlights. They are expensive to replace and someone could throw a rock your direction.
6. Put your color group sticker on your windshield in the upper left corner and add your numbers on each side.
7. Now relax and wait for the drivers meeting. The next two days are going to be an experience you won't soon forget!