

Attitude Adjustment

Want to make a Z06 ride like a luxury car on the street and a C6R on the track?
Jeff Glenn shows you how; pix by the author.

Why would anyone want to take the best Corvette suspension yet—that on the latest Z06—and start messing around with it? Because some people use their cars differently than others.

Mark Stein, from Motor Sport Image in Roseville, California, has his own ideas about how pumped-up Corvettes should behave on the street. He started out as an autocrosser and moved into roadracing, where he thrived by developing his own brand of chassis setup for closely matched SCCA club classes. Since then, his tuning firm has expanded its activities to cover engine and suspension setups for both streetcars and full-blown racers.

"There are two reasons to switch to an adjustable shock," Stein believes. "First, when you have a fixed-valve shock, you don't have a choice [for conditions]. As great as that Z06 suspension is, it was developed specifically for the Nürburgring. We don't have one of those over here—most of us are driving these cars on the street." Stein goes on to explain that he also finds the factory setup a bit harsh for California backroads. (As a confirmed coffee addict, he says, he prefers sipping his morning brew, not wearing it on his shirt.) Stein and his track-minded customers also take issue with the understeer-biased safety net that GM builds into all of its cars. While a possible life-saver for inexperienced drivers, this trait can be annoying to experts. "If you take the stock setup out for a track day, you'll probably find that it's understeering sooner than you really want it to."

Understeer/oversteer balance is typically tailored by altering antiroll-bar rates, but the OE Z06 bars aren't adjustable. Thus, adding adjustable shocks lets the owner "...dial the rears or fronts up or down to compensate," the tuner explains.





The QA1 adjustables we'll be fitting today have 18 levels of adjustment that simultaneously vary compression and rebound. They run about \$1200 per set (hardly chickenfeed, but not outrageous in this market), and are best suited to cars that will alternate between street duty, track days, and/or club racing. If you plan to run longer track sessions (more than an hour at a time), costlier remote-reservoir options from Ohlins, Penske, or Moton might prove a better choice.

Technically, QA1 doesn't list a C6 damper in its catalog yet, but Stein did his homework on C5/C6 suspension geometry and determined that the shock lengths are the same and the operating angles almost identical. Ditto

the mountings. Jeff Young, our wrench guy, will take us through the install; the car we'll be working on belongs to MSI co-owner Terry Fong, who uses his new Z06 for daily driving and occasional track excursions.

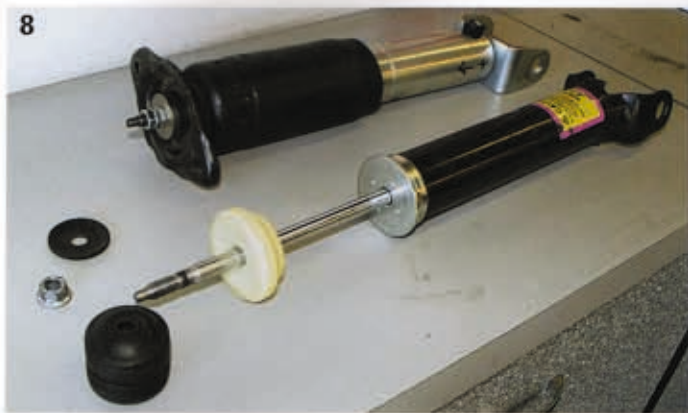
A: Break the lugs loose, then lift the car up in the air and take off the wheels (*photo 1*). We'll start with the rears first, since there's less stuff to move around at that end.

B: Locate the upper shock bracket on the frame between the two upper-control-arm mounts. Loosen the two 13mm bolts (*photo 2*) and pull them out. Don't worry—the shock absorber isn't going anywhere. The gas charge

inside the unit wants to extend it up into the body, which keeps everything in place.

C: There's only one through-bolt securing the shock on the bottom (*photo 3*); go after this sucker with a 15/16ths socket and wrench. You'll probably need to use an impact gun on one side or a breaker bar on the other.

Once the long through bolt is loose, pull it out and find yourself a big, narrow pry bar (*photo 4*). Grab the shock body and compress it upward enough to slip the pry bar between the lower control arm and the fork of the lower shock bracket (*photo 5*). Pry up from the bottom while rotating counter-clockwise, so that the prong slips itself over the lower arm



(photo 6). Once it's off the arm, the shock rod will extend itself out. Let the whole unit drop out towards the rear of the car (photo 7).

D: Put the old shock on the bench and yank the top-mounting bracket and rubber boot. (The boot is critical to keeping grit out of the new unit, so don't forget it.) Loosen the single locknut at the top of the OE shock, then pull off the bracket, the bushing, and the boot. The new unit should come with its own bushing (photo 8). Grab this and move it out of the way; slip the boot over the top; and drop the mounting bracket in place. Replace the bushing, then re-tighten the nut and locknut. Bring the new shock back to the car (photo 9).

E: Unlike the standard gas-charged shocks, the oil-filled adjustable QA1s stay compressed and don't want to stretch to their full limit by themselves. This makes them relatively simple to pop in. Now, if you're just dumping the OE shock for another gas shock, the trick there is to compress the new unit while it's still off the car and then hold the rod in place with a cable tie. The easiest way to rig that up is to put one end of the shock on a piece of cardboard or a rag on the shop floor, compress the shock with your weight, and then wrap the tie between the lower forks and the top mounting bracket (photo 10). That way the shock will remain compressed while you monkey it back into the proper location.

F: With an oil-filled aftermarket damper, back off the adjuster (turn the knob counter-clockwise on QA1s) and compress the shock more than you need. Slip it back into the general vicinity on the car, line up the lower fork (photo 11), and replace the large mounting bolt and nut. Next, extend the top to meet the bracket on the frame and reinstall the 13mm bolts (photo 12).

G: MSI likes to start with the adjusters three clicks away from full soft; whichever units you're using, set the adjusters in accordance with the instructions or your own experience. The important thing is to make sure you know where each shock is starting from.



H: While it was decided not to do this on the rear of Fong's car, MSI usually installs the adjusters facing inward—in other words, toward the center of the car. As Stein says, "It's totally counter-intuitive, but you can actually get to the adjusters more easily that way once the tire is back in place. At the track, you just lay on your side, reach around the tire, and twist the adjuster inward to stiffen it up or outward to loosen it." When installed with the adjusters facing outward, it's a tighter, less comfortable reach. Once you've repeated the shock installation on the other side, you're done with the rears.

I: Moving on to the front, lower the car back toward the ground to gain access to the engine

compartment from above. At the left front, take the coolant reservoir out of the way by removing the two 10mm bolts that hold it to the inner fenderwell (photo 13). Swivel the tank off to one side and place it on top of the throttle body while leaving the feeder tube firmly attached (photo 14). That way, you won't lose any coolant or make a big mess. With the tank out of the way, you have access to the top bolt of the front shock (photo 15): Unbolt the stock locknut and pull off the top bushing and washer.

J: Next, climb under the car and remove the two lower nuts holding the lower shock bolts to the lower control arm (photo 16). (The arm has recessed holes on its bottom to aid access

to the nuts.) Again the OE shocks want to expand, but the fronts don't need persuasion from a pry bar. Instead, you need to detach the upper control arm from the frame to gain enough room to sneak the old shock out.

K: Loosen the four bolts from the frame (photo 17) and pull the control arm towards you, being careful not to spread out the alignment washers located behind them (photo 18). Fortunately, Chevrolet included a rubber-inserted washer as the innermost shim in this system, and this helps keep all the washers properly located (photo 19).

L: Let the lower control arm swing down while the upper arm is still attached to the up-



right. The limiting factor in your ability to swing this piece out is the still-connected brake line, but with a little fussing and coaxing there's just enough room to get it done. Let the original shock expand to its full extension point, then pull the top out of its hole in the frame (photo 20). That should alleviate any pressure on the bottom bolts, which can now be lifted right out. The shock can be removed from the car now by coaxing it toward the front and away from the chassis.

M: Loosely screw in a couple of the upper-control-arm bolts (photo 21) so that you're not going to be tied up at the front of the car just keeping everything all together. Once you have the control arms pegged, go to the bench

and swap the original front dust boot onto the new shock (photo 22).

N: Make sure the bushing is in place on top of the boot and that the swiveling lower-shock-bolt mounts are at the correct angle (photo 23), then feed the new shock into place. MSI typically reuses the stock lower bolts, as these are longer than the replacements that come with the (technically C5-spec) QA1s. Once the shock is in place, drop in the bolts and retighten the bottom nuts to 21 lbs-ft.

O: Because the shocks don't self-extend like the stockers and are a little bit shorter overall, there's a trick required for lining up the top bolt. Take a piece of fuel line—maybe eight

inches or so—and feed it through the upper shock-mounting hole in the frame (photo 24). Next, slip the end of this hose over the shaft at the top of the shock (photo 25). (Don't worry—you'll see why in a moment.) Now, go ahead and re-torque the upper-control-arm bolts to 48 lbs-ft.

P: To feed the shock up into the hole, grab the front wheel and put it back onto the hub (photo 26). Snug the wheel lugs down without torquing. Now, slowly lower the car onto its wheel. As you do, the fuel line on the shock shaft will guide the rod up into the frame hole (photo 27) so that the new shock top appears in the engine compartment in the right place all on its own.



Q: Once the rod comes through, pop off the fuel line, drop the bushing and washer onto the shaft, and cinch down the main nut and locknut (photo 28). Return the coolant reservoir to the fender (photo 29), then go ahead and dial the adjusters to your preferred starting settings.

R: Up front, the oil-filled adjustables won't hold the car up the way the original gas ones did. Depending on your desired ride height, you can adjust the jack-screw snubbers at each end of the front leaf spring (photo 30) to get it dialed in just right.

If stock ride height is your goal, four full turns moves the snubbers up about one-quarter

of an inch, getting you more or less back where the factory placed the car. You can also lower the front of the car by a tad more than a quarter-inch simply by not turning the snubbers at all. If you want to lower the ride height beyond 3/8ths, MSI has figured out a different QA1 shock option that drops the car further at the front while preserving the regular range of travel at both ends.

S: Repeat the front-shock installation procedure for the opposite side, noting that this time there's no reservoir to pull out of the way first. Re-check all your fasteners, settle the car down on its tires, and that's it—you've just finished a high-performance shock installation.

Once the car is all snugged up and back on the ground, torque the lugs to 100 lbs-ft (photo 31) and take it out for a spin (photo 32). On the road, the difference in Terry's Z06, now fit with QA1s set three clicks away from full-soft, was striking. Between these new dampers and trading the OE runflats for non-EMT performance rubber, the car felt smooth and compliant to the point of near-absurdity—more like a luxury sedan than a Z06.

That's the purpose of high-quality adjustables, of course: Being able to go from plush to performance in minutes. Best of all, the whole installation shouldn't burn up more than a fun afternoon in the garage. ○