SUPPLEMENTAL STILLEN SUPERCHARGER INSTRUCTIONS (2/11)

FOREWORD: These instructions amend Stillen's Instruction book, and are intended for 1st-time installers. Whoever wrote Stillen's instructions had the thoughts I've included already embossed in memory, as will you after you've completed the installation. Because many of the procedures I've described are implemented automatically by Stillen personnel, you won't find them in the Instruction book. When combined, the 2 sets of instructions should enable faster and smoother installation by any DIY mechanic of average skill. However, because I have no control over how you interpret or implement these instructions, I neither express nor imply any warranty as to the result of your using them.

GENERAL: Throughout the Instruction book, and these supplemental instructions, the term **right** means the passenger side of the car, and **left** means driver's side. Instruction book means the spiral-bound instructions Stillen supplies when the supercharger kit ships. Unless specifically amended by these supplemental instructions, the instructions in the Instruction book are to be followed as printed.

Although the kit is extremely complete, the following should be on hand before beginning:

1. A fiber-optic mechanic's scope. A Visual Optics VSOVS246W1 works, and may be purchased online from Tooltopia.com for $214.99 (free shipping). This, or a similar scope, is **absolutely essential** for tightening 2 of the bolts under the intercooler manifold. Photos and instructions regarding its use are provided later. Stillen somehow "overlooks" mentioning this requirement anywhere in the purchase process or in the Instruction book.
2. Also required for installation of the ECU's supercharger flash, and for viewing photos accompanying these instructions while working, is a laptop computer connected to the internet.
3. A die grinder with a 1/4" diameter carbide file and a 1/32" x 3" cut-off wheel.
4. A saber saw and a 1 ½ diameter hole saw, needed to cut various plastic pieces when installing the intercooler hoses.
5. An aerosol can of 3M 77 adhesive, available from Home Depot, used to secure manifold gasket.
6. A small quantity of PTFE (best to use)or silicone grease, to be used during manifold installation and for all hose connections, especially the supercharger connections.
7. A Dremel-type drill, equipped with a chuck and a rotary file.
8. A flat-blade screwdriver with a 9" long blade and 3/16"-wide tip. An old screwdriver will serve, because you're going to modify it, per later instructions, for tightening the right-side manifold bolts. See paragraph 10, page 4 of these instructions
9. A 16" long piece of iron pipe to slip over a 3/8" drive breaker bar for increased leverage (required move belt-tensioner pulley to remove and install the multi-groove drive belts).
10. 10' of 18 gauge uninsulated unstranded copper wire, available from Radio Shack—useful when working alone to remove and install fuel pump.
11. Optional: An old, or cheap new, pair of slip joint pliers, modified by arc welding a blob of metal to the inner surface at the end of one of its jaws, and grinding it to produce a flat surface about 3/16" square. Not absolutely necessary, but useful for removing Nissan's electrical connectors, most of which fit so tightly they must be pried loose with a screwdriver while the connector's release tang is being depressed with this tool.

FUEL PUMP MODIFICATION:

SAFETY:

1. Work outside in an open space with natural illumination. Often-overlooked sources of gasoline ignition are incandescent light bulbs, or the switch on a trouble/work light. If you need more light, use a flashlight. Don't smoke anywhere in the vicinity.
2. The 370Z gas tank should be no more than half full when removing pump. With the tank full, 3.3 gallons of fuel are above the fuel pump location, which will flood the area with gasoline if you remove the pump.
3. Remove the gas filler cap. This relieves fuel pressure produced by the vapor recovery system.
4. Before disconnecting the car's negative battery cable, relieve the fuel system's pressure by "starting" the engine at least 3 times, *with the fuel pump electrical connector disconnected.* The connector can be removed after the still-sealed fuel pump is accessed inside the car.
5. For the safety of your side windows, and to minimize gasoline-fume accumulation, roll down the windows and open the doors before disconnecting the battery.

PUMP REMOVAL:

1. I recommend that you visit (and bookmark/favorite- mark for future reference) the following web site before beginning. **http://www.cj-motorsports.com/370zpump.htm** Specifically, look at the fuel gauge float rod arrangement. It greatly aids understanding these instructions:
2. Move the passenger seat and its backrest fully forward. Move the driver's seat fully back.
3. Place 2-3 folded bath towels in the well behind the passenger seat, not to catch spilled fuel, but to keep from breaking your right leg when you kneel in the well behind the seat.
4. Remove the carpeted fuel-pump access panel behind the passenger seat by prying with a large screwdriver under its left front corner until the panel end lifts enough to insert the 1" long right-angle bend of a 12" piece of 1/8" welding rod under it. Use pliers to pull on the protruding welding rod until the panel pops free from its plastic retainers. An old screwdriver with the blade bent at a right angle 3/4" back from the tip also works.
5. Using 10 mm wrenches, remove the 4 nuts from the metal cover plate studs, then remove the cover and hang it out of the way. Carefully remove and save the neoprene-felt sound deadener.
6. At this point, perform SAFETY step 4. to relieve pump pressure, then disconnect battery.
7. Disconnect the pump-to-engine fuel line by squeezing with your fingers the 2 plastic tangs at the end of the its quick-disconnect fitting. Have a rag handy to catch the teaspoon or two of fuel lost when you hang it down to drain. Wire a small piece of rag around the fitting to keep dirt out, then move it out of the way.
8. Using a Phillips screwdriver and 8 mm wrenches, remove the 6 bolts securing the pump's lock ring.
9. Carefully maneuver the fuel pump out of the opening until the factory bend at the bottom of the fuel gauge's float rod (driver's side of pump) is about 1" below the level of the tank opening. If you're working alone, use the suggested copper wire to hang the pump in this position from the car's chassis brace located above and behind the seat area. Otherwise, have an assistant in the driver's seat hold it. Carefully snap the float rod out of its plastic retainer and pull it out of the gauge. CAUTION: the movable arm on the gauge into which the float rod inserts is now unsecured. Secure it to the gauge via a piece of aluminum-backed adhesive tape cut to 3/16"

wide x 1” long. Wire the float rod securely to the left-rear cover stud to prevent losing it into the tank.

10. Now lift the pump out of the opening until the saddle tank line's quick-disconnect fitting can be removed. Wire the saddle line to the top-right cover stud after the pump is fully removed.
11. On a clean workbench, outside in open air, carefully slit with a razor blade the ends of the pump- discharge- to- plastic pump housing corrugated fuel line and remove it from its fittings. This is the hose shown in the mechanic's hand in photo 9, page 5 of the Instruction book and being slit on the **previously-mentioned website**. Hold the pump assembly in various positions to drain residual fuel, then blow everything out with 25 psi compressed air. Absent gasoline, remaining work can be done inside.
12. With a marking pen, make several reference points on the bucket, its retaining rods and clips, the internal plastic pump housing, and the plastic pump retaining ring. This helps with bucket-to- pump housing re-assembly orientation. If you have a digital camera, use it.
13. There is no removable electrical connector on the factory pump, so cut the wires at about 1” from the pump. If your pump retaining ring (Instruction book 8., page5) has plastic clips holding it into the internal plastic pump housing., you'll have to use needle-nose pliers to break them. Remove the fuel filter from bottom of pump, then pull the pump and ring out from the top. Now grind the ring approximately per Instruction book 9, page 5, until it's a snug fit over the Walbro pump.
14. Re step 12, page 6 of Instruction book: Do **NOT** pry the swirl jet. Instead, place the bucket on a block of wood with the jet overhanging the block's edge, then tap the protruding swirl jet tube flush with the inside of the bucket using a hammer on a 5” long piece of broomstick handle or similar non-marring material. You can fit the #50 drill bit into the Dremel chuck, and using the Dremel's slowest speed, machine drill the jet. It's soft plastic, and to prevent over-drilling it's better to hand turn the #50 bit, using a pin vise if you have one, or pliers if you don't. After drilling it, push it back into position with your fingers.
15. Ignore the obvious typo in the Instruction book's step 15, page 6, and use the supplied 7/64” drill bit to machine-drill the regulator bypass orifice. You're only drilling through metal about 1/16” thick. Don't use any lubricant. Shavings are easier to blow or knock out dry than oily.
16. Insert the pump from the top into its plastic housing. You must position it so that when the fuel filter is placed on the bottom of the pump, and the pump housing placed in the bucket, the fuel filter aligns with the corresponding depression in the bucket. When you put the ring back over the top of the pump, it won't lock the pump solidly in place, but when the pump is reconnected with the Stillen-supplied submersible hose, it can't rotate or move vertically.
17. Step 16 on the Instruction book's page7 is unnecessary. There's nothing restricting vertical placement of the pump, so grinding the fuel-filter housing isn't required.
18. Connect the Stillen-supplied submersible fuel line and clamp it per Instruction book's direction. Also follow its directions for electrical connection. Double crimp both ends of each connector and pull hard on the wires to ensure a solid connection.
19. Reverse these instructions' steps 6-10 to re-install the pump after modification, but leave the pump accessible so you can disconnect the pump's electrical plug to relieve fuel pressure after you move the car inside for the supercharger installation (for when you remove fuel rails and injectors). Reconnect the battery and turn the ignition on to check for fuel leaks. Test drive the car to ensure the new pump works properly.

# SUPERCHARGER INSTALLATION

1. **Trim piece removal**: Roll the windows down, then disconnect the battery's ground cable using a 10 mm wrench. Remove the plastic clips(pry up the clips' center button, then pull it to remove the clip) securing: (1) the center cowl cover at windshield's base; (2) the passenger-side piece of cowl cover (in addition to plastic clips, use a screwdriver between the cowl cover and windshield side-molding to pry loose the conical plastic retainer at the bottom-right corner of the windshield); (3) the battery area surround; (4) the master cylinder area surround. Remove and set these pieces aside for reinstallation.
2. **Cowl brace removal**: Using a 14 mm socket, remove the nuts and bolts securing the cowl brace's 3 attachment points, then remove the brace. Set aside for reinstallation.
3. **Fuse box preparation**: Test for removability the plastic fuse box located on the fender side of battery and revealed after the right cowl cover and plastic battery surround are removed. If it doesn't slide easily up out of its metal bracket when the release tabs are depressed, spray the bracket's contact area with WD-40, then tap the box firmly from side to side with a rubber mallet. Once freed from the bracket, leave the box loose pending installation of the relay for the intercooler's water pump.
4. **Clearance grinding**: Proceed with remaining steps on the Instruction book's pages 8-9. In addition to cutting off the overflow bottle-mounting brackets, you will need to use the file on the Dremel drill to grind 3/16" from the top radiator support's rear edge, per photo TubeClear.jpg, and to recess the right bottle-mounting bracket about 1/8." These steps are necessary to provide clearance for the polished aluminum supercharger-outlet-to-throttle body tube when it is installed. While you're creating a mess, this is a good point to perform steps 1 & 2, page 14 of the Instruction book. Enlarge the opening for the supercharger's inlet elbow everywhere you can without grinding metal.
5. **Bumper fascia removal**: Jack the front of the car up and support it with jackstands. Remove the bottom engine shield by removing its plastic clips and bolts, using a 10 mm socket on a cordless drill motor. Remove the plastic clip from inside both fender wells, then use a wooden paint-stirring stick (free at Home Depot) to move the black plastic inner fender protector outside of the fender lip all the way from the bottom of the fender to the upper point required to access the fascia-attachment bolt about 4" in front of the fascia's peak behind the headlight (see Fascia.jpg). Remove these bolts in both wells with a 10 mm socket on a nut-driver handle. Remove the 7 plastic clips securing the bumper fascia's upper edge. Remove the 6 clips securing the fascia-to-radiator cover, and remove it. Detach the fascia from its plastic attachments under the headlight by a firm, 2-handed yank on each side, and remove it. It's lightweight, and both removal and installation can be performed by one person. Store it out of the way in a safe place. Leave the car jacked up.
6. **Serpentine belt removal**: With a 3/8"-drive breaker bar and a 16" long piece of iron pipe to slide over it in your hands, slide under the car. Insert the breaker bar's 3/8" square driver into the corresponding square hole in the car's tensioner-pulley bracket (located at engine's passenger-side front). Slide the pipe over the bar and pull towards the driver's side of the car until a topside assistant is able to lock the pulley in place by inserting a 1/4" Allen wrench into the aligned slot and hole. **Remove the car from the jackstands for the next steps.**
7. **Fuel rail removal and re-installation**: Perform steps 1-4, page 9 of the Instruction book before removing the fuel rails and injectors, as described on page 11 of the Instruction book. Make sure you have first released the fuel pressure, as described in SAFETY step 4. Then, using a screwdriver, force the fuel rail's electrical connector, located at the back of the left fuel rail, backwards off its metal bracket. Do not attempt to unplug it yet, because the connector's

release tang is facing down. Next, pry all 6 fuel injectors up out of their seats in the factory manifold, then lift the fuel rails and move them forward until the electrical connector can be reached easily. Turn the connector over, so that the release tab is visible, then disconnect it and remove the rails and injectors from the car. Install the Stillen-supplied injectors and modify the fuel feed tube as described on page 11. Reinstall the fuel rails, fuel feed tube, and injectors. Then, after double-checking injector seating, install the electrical connector. Next, install and fully tighten all 4 rail-retaining bolts, using a 12 mm socket. Although unnecessary, you may push the electrical connector back into its metal bracket.

8. **Manifold gasket installation**: Thoroughly clean the factory plenum-manifold silicone gasket with soap and water, then dry it completely. Ascertain which side of the gasket fits into the grooves on the Stillen manifold, then place it, that side up, on a 3 square foot layer of newspaper on the shop floor, laid out so you can walk around the gasket. Now spray the gasket with 3M 77 adhesive, being sure all areas not in newspaper contact are coated with adhesive. You want the gasket to adhere to not only the bottom, but also the sides, of the grooves after installing it. Allow the adhesive to dry until you can lift the gasket by touching it with a finger (about 15 minutes). Install the gasket, pushing it firmly into the grooves.
9. **Manifold bolt tool**: Make the bolt-tightening tool I designed, consisting of a bent screwdriver (see photos BoltTool1-3.jpg), which permits rapidly turning the bolts until they contact the manifold via notches in the bolt flanges. **If you don't take the time to make this simple tool and serrate the bolt flanges, you'll live to regret it.** Specifically, the screwdriver used has a 9" long blade with a 3/16" wide tip, and is bent, after heating with a hand-held propane torch, at approximately a 20 degree angle, 2 1/4" back from the tip. Serrate the flange-edge of 3 manifold bolts, using a 1/32" x 3" abrasive cut-off wheel on a die grinder (see photo ViseBolt.jpg,). Before clamping each bolt in a vise, place a nut on the end of the bolt to prevent damaging its starting thread. As evident in photo BoltSerrate.jpg, serration need not be done precisely.
10. **Installation of the 3 serrated right-side bolts**: Leave them protruding 1/2”, as directed on page 12 of the Instruction book. They must turn freely. Also perform step 4. on that page.
11. **Manifold installation**: After checking to make sure the gasket is firmly held in place on the manifold (re-glue if it isn't), coat the protruding gasket with a thin film of PTFE or silicone grease, thereby ensuring that it will slide smoothly when you move the manifold into place under the 3 right-side bolts. Slide the Stillen manifold into place under the 3 bolts, then install all of the remaining bolts until they contact the manifold. The right-side 1st (front) bolt is visible, so tighten it by any means you choose until it contacts the manifold, then use the Stillen-supplied wrench to tighten it ¼ turn more.
12. **Fiber-optic scope set-up and bolt tightening:** Photos ScopePhoto1-6.jpg variously show how to clamp the scope and probe, as well as approximate bending of the probe required. The scope itself must be rigidly clamped to the top radiator support, so that it cannot move in any plane. The 2 wooden blocks (1x2 x2”) on either side of the scope's handle, clamped with 2” c-clamps, prevent lateral motion; the 3” c-clamp prevents vertical motion. The 1 1/2” x 3 1/2“ piece of wood seen bonded to the radiator cap via double-sticky sponge tape sprayed with 3M 77 adhesive, and the one clamped diagonally on the radiator support, are sections of a large Home Depot paint-stirring stick,. They provide a place to use spring clamps to secure the scope's probe in position, should the need arise.

    **A.** Tighten the 2nd (center) bolt next. If you switch the scope on and insert its probe under the front of the manifold, it illuminates the bolt so that you can see the bolt directly by looking under the front of the manifold. This gives you some idea of how to insert and bend the scope's probe so you can see the bolt on the scope's screen. You want the probe to “look” at the bolt from the right and slightly above. Insert the probe under the front of the manifold about 4 1/2”

to 5," measured from the front edge of the manifold. *Remember, the bolts are located in the center of the manifold's 3 raised runners*. Keep those locations in mind when using the scope or bolt-tightening tools. When you see the view of the bolt depicted in ScopeBolt1-3.jpg, you have the probe in the right position. The probe must remain immobile, so manipulate, and/or clamp it, until it does. First, insert the bent screwdriver under the manifold's right side, tightening the bolt to manifold contact. Use the Stillen wrench to **fully** tighten it (about 10-14 ft/lbs). Only about ½ - ¾ turn of the bolt with the wrench is required.

**B.** Now **fully** tighten all of the left-side and end bolts, using a ratchet and 12 mm socket.

**C**. Next, insert the probe under the manifold about 8 ½," bending it to produce the same bolt view of the 3rd right-side bolt as in ScopeBolt1-3.jpg**. Fully** tighten the bolt.

**D.** Check that all other bolts, including the front right-side bolt, are fully tightened, and you're finished.

13. **Throttle body fuel and water lines**: Follow the Instruction book's steps 8-11, page 13-14, with these modifications:

A. Bend the 90 degree water tube on the rear throttle body before installing the throttle body. A 12 mm or 1/2" deep socket on an extension, with the socket placed over the tube, bends it easily on the bench, without marring it.

B. Using only your fingers, bend the fuel supply line about 1/4" towards the car's right side. The bend is approximately correct when 7/8" is measured between the front edge of the throttle body's integral plastic receiver for the wiring connector and the point on the steel tube where the black neoprene bonded to the fuel line's steel tube ends. See FuelBend1-2.jpg) This bend is necessary to provide clearance to install the electrical connector. To minimize the fuel-line bend required, I recommend that while you have the connector off for lengthening the throttle body wires, you carefully file the free end of the connector's shell nearly flush with the terminal block. Leave about 1/16" beyond the terminal plug to avoid damaging it. Blow out the connector after filing. Similarly, rounding the front-outside corner of the connector also minimizes the bend required. There are no terminals in the area, and shortening the release tang neither interferes with the tang's operation, nor prevents the connector from locking in place

C. Use a 5.5 mm Allen wrench to install throttle bodies. Follow Instruction book step 11, pages 13-14 to connect the throttle body water lines. Stillen supplies 3/8"/10 mm hose to make these connections, but the tubes onto which the hoses fit are 8 mm. Consequently, you must tighten the clamps sufficiently to crush the extra hose diameter. **When properly tightened, the hose cannot be rotated on the tube.** Place all clamps in a position that will permit re-tightening later. See TBWaterLines.jpg).

14. **Front throttle body ( and MAF) wire lengthening**: Beginning at least 2" back from the throttle body connector, cut the first of the 6 wires. Cut each successive wire 1 1/4" farther back. Staggering the cuts avoids bunching the connectors, thus making the wires easier to install in the split looms. Cut the 6 Stillen-supplied, color-coded wires all to the same length, which is determined by the combined length of new and original wire allowing easy connection to the throttle body. Leave a little extra; you can't cut wire back on. Strip 5/8" of insulation from each wire's end, then fold the stripped section back on itself to make a doubled wire 5/16" long. Use needle-nose pliers to flatten the bend's radius. Ensure that the bare wire fully enters the Stillen-supplied butt-connectors. **Double or triple crimp each end of the connector, then test the connection by pulling hard on both wires inserted into the connector.** Do not crimp the free plastic part of the insulator. Doing so accomplishes nothing good, and leaving it uncrimped allows continuity testing should you wish to do so after wire lengthening. Cut the Stillen-supplied split loom to length, then push the wires into the loom. Tape only as needed to ensure the wires are protected. Plug the connector onto the throttle body when finished. Use the same technique when performing the MAF wire lengthening later.

15. **Supercharger (SC) installation tips**: **(1)** Don't make the mistake of installing the 7-rib and lower idler pulleys before mounting the SC. They prevent access to the mounting-plate bolts. Also, make sure the molded inlet fitting is in place with a clamp, and its internal connecting surfaces greased before you start the SC mounting. **(2)** After mounting the SC, hold the SC outlet end of the aluminum SC-to-throttle bodies tube about 1/2" away from the SC, and check the alignment of the its bypass valve fitting with the bypass valve hose. Mine required shortening the long hose 1 1/2" for fitting alignment, and removal of 1/2" from the short bypass valve vertical hose to raise the valve off the radiator cooling fan's shroud. **(3)** With the couplers liberally greased, install the SC-to-throttle body tube as follows: push the SC outlet coupler on until it's flush with the tube's end; push the tube-throttle body couplers as far back on the tubes as possible. Connect the bypass valve to the tube's fitting and clamp it. Put the tube in place, and, with clamps in position, use a wooden paint-stirring stick to push the couplers onto the throttle bodies. Make sure you put the couplers on with the word 'STILLEN' showing from the top front, or someone from Stillen will come to smack you :) Then do the same with the SC coupler. Push it onto the SC outlet ¾." Tighten all the clamps securely. **(4)** Align the screw on the SC inlet-to-elbow hose clamp so that it is accessible for tightening from outside the left fender well—and don't forget to tighten it. **(5)** Plug in the MAFs, and align the 'Y' tube and air cleaners as shown in AirCleaners.jpg, with the MAFs facing the radiator and aligned perpendicular to the ground (the last prevents a false left-bank lean OBD2 fault reading). Observe the instructions on the 'Y' tube and elbow stickers about alignment and insertion. **(6)** Install the air cleaner splash shield-unless you enjoy being stranded by the first puddle you encounter.
16. **Installing the new belt:** Refer to the diagram on page 16 of the Instruction book for the belt pathway. Have the following on hand before beginning: the 3/8s breaker bar and leverage pipe for releasing the tensioner pulley; a 19 mm socket for turning the crankshaft via its center bolt; an assistant or spring clamps , or both. From the top of the car, place the belt, beginning with the supercharger, continuing over the AC compressor pulley on the left, under the Stillen idler pulley over the power steering and alternator pulleys to the right, with the free belt portion at the bottom. Either spring clip the belt to pulleys to hold it in place, or have your assistant hold it. From under the car, run the belt around the crankshaft pulley. Now fold the free portion of the belt so that the resulting loop can be pushed with the small paint-stirring stick between the top of the crankshaft pulley and the right idler pulley. This allows you to place the belt around the left idler pulley, then under the right idler pulley. Place the belt on the tensioner pulley from behind (between the back of the pulley and the engine). It probably won't go on fully until you rotate the crankshaft via the 19 mm bolt in the center of the crankshaft pulley. After checking that the belt is properly positioned on all the pulleys, have your assistant remove the Allen wrench unlocking the tensioner pulley while you jockey it into position for him/her to do so.
17. **Intercooler pump mounting and hose routing**: I successfully routed the hose from the bottom fitting on the intercooler tank (step 3, page 18 of Instruction book) to the water pump differently than Stillen explains. You can do it any way you like. I used my method because it provides a path away from heat and abrasive surfaces which might damage the pump inlet hose. First, remove the plastic clips holding the flexible black plastic piece pictured in photo ICHoseRoute.jpg. Enlarge the opening in it as it appears in the photo. Mount the pump upside down, with the inlet-outlet positioned per photo ICPumpMount1.jpg. Photo ICPumpMount2.jpg shows the location of the bracket-mount self-drilling screws. Photos ICPumpMount3&4.jpg show the loop in the inlet hose (from bottom of tank) required to prevent kinking. Because none of the Stillen-supplied hoses are long enough to reach, and the pump inlet is ¾," while the tank fitting is 5/8," a short piece(about 4") of one of the dual diameter (3/4"-5/8") hoses must be

spliced onto the tank hose for pump connection, using a 3”-long piece of 1/2” rigid copper plumbing pipe (5/8” O.D.). The 2 hose clamps on the inlet hose in the photo represent the splice. The other dual-diameter hose from the pump outlet runs through the 1 1/2” diameter hole cut with a hole saw, over to the bottom fitting on the intercooler radiator. A second splice is required in the 5/8” hose from the intercooler radiator's top fitting to the right intercooler fitting on the Stillen Manifold. The splice occurs just before the hose enters the right air duct, and is made with a 3” piece of 1/2” copper pipe. Sounds complicated, but it isn't.

18. When re-installing the cowl brace using the Stillen-supplied triangular spacer-plates, close the hood carefully the first time. I had to remove the left spacer because it kept the hood from closing fully on that side. No need to remove the whole brace; just remove the fasteners on the problem side, pry that side of the brace up, and remove the spacer. Without it, clearance is still adequate to allow for engine movement.

## TROUBLESHOOTING

19. When the installation is complete, the engine should fire and run correctly on the first try. If it doesn't, it's a virtual certainty it's due to your error, and is not due to a problem with the kit.
20. Vacuum leaks: If you followed my instructions for gluing the manifold gasket in place prior to manifold installation, you've eliminated the primary source of vacuum leaks. All of the vacuum lines are tight enough on their fittings so as not to even require clamping. Just make sure they're all connected. If you suspect a vacuum leak, start the engine and spray brake cleaner (it contains acetone) around the manifold. The engine will stumble or speed up for a moment when the leaking area is sprayed.
21. **The most common error** is a bad connection in the lengthened wires to the throttle-body or MAFs. Your car's ECU interprets very precise electrical inputs. Alter even one of those inputs by a bad connection, and nothing works right. Don't just look at the connections: take the time to do a continuity check, using an ohmmeter and one small pin inserted into the connectors' receptacle and another inserted into the butt-connector closest to where the wire was cut at the factory harness.