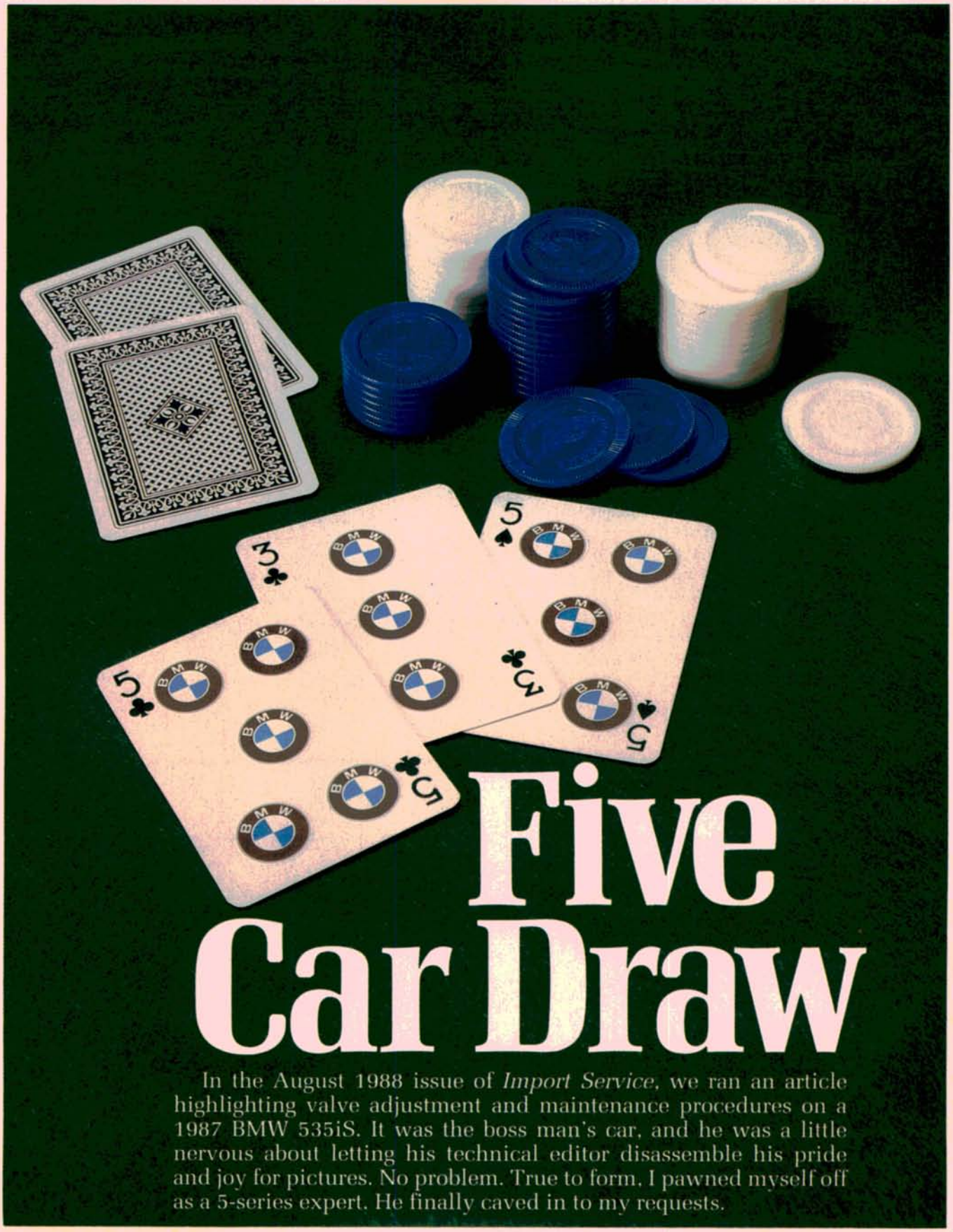


Five Car Draw

In the August 1988 issue of *Import Service*, we ran an article highlighting valve adjustment and maintenance procedures on a 1987 BMW 535iS. It was the boss man's car, and he was a little nervous about letting his technical editor disassemble his pride and joy for pictures. No problem. True to form, I pawned myself off as a 5-series expert. He finally caved in to my requests.

Five Car Draw

In reality, that warm afternoon in May was the first time I'd ever laid hands on a 5-series. Now, three years and a ton of miles later, the odometer on the same 5-series has turned over. But at 100,000 miles, the boss man has decided to keep the car. I think this must be one heck of a compliment to the BMW. If I've ever seen a fast car flogged by a lead foot, this is it. And as far as maintenance is concerned, CA would rather have a tooth filled than change the oil. What a fine example for America's youth!

It'll Take Some Work

To say that this 5 Car is a lucky draw would be an exaggeration. It's time to raise or fold. Here's what we have in the hole:

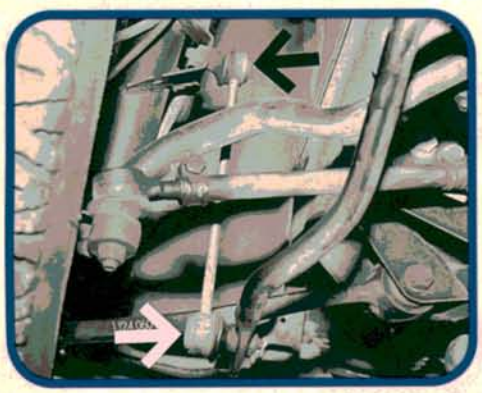
- The original exhaust has finally lost it's battle with Ohio road salt.
- The original battery still gets the job done as long as you start the car every day. (I had suggested that a new one was probably good insurance before last winter set in. But CA decided that it was a point of honor to get the original volt box past 100 grand. It made it, but just barely.)
- The second set of Michelins has lasted precisely 50,000 miles, just as the first set did.
- The clutch is original, but the clutch hydraulic system gets funky at cold temperatures. Looks like time for new slave and master cylinders.
- The only ignition parts ever replaced have been the plugs. While we've chosen to install a new cap and rotor, we decide to go with the original spark plug wires a while longer.
- The car runs like an old farm tractor at the moment. But there doesn't seem to be anything wrong enough that a good maintenance won't fix. We also suspect that some injector and carbon cleaning are in order.
- Surprise, surprise, the controller board (SI board) in the instrument cluster is *getötet*. (That's German for dead.) This is causing some strange electrical activity in the dash, including erratic fuel and temperature gauge readings. We'll show you how to replace the board and get the instument cluster working again.
- The thrust rod bushings in the front end are cracked and worn, and need to be replaced.
- To the BMW's credit, the only non-maintenance repair performed to this point, has been the replacement of the water pump and fan clutch, and an outside door handle which broke ten minutes after the warranty expired. But it's time for some tender care.

Electrical Service?

Many times we dive into a project car without deciding beforehand where the story will end up. Usually, a "what you find is what you get" approach makes that decision for us. You'll probably notice that this overview has a strong emphasis on electrical problems. The replacement of the SI board in particular, was just too interesting to pass up.

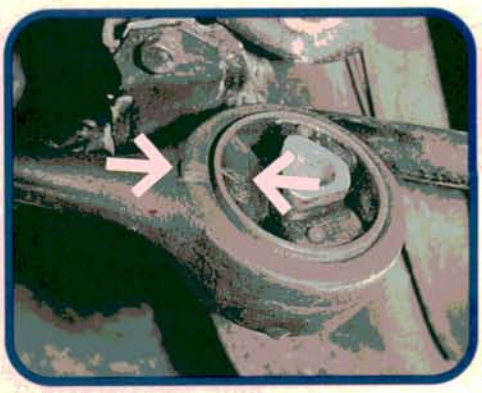
Thanks again to our friend Callan Campbell for his help. He added a number of tips above and beyond what we found wrong with our test car.

—By Ralph Birnbaum



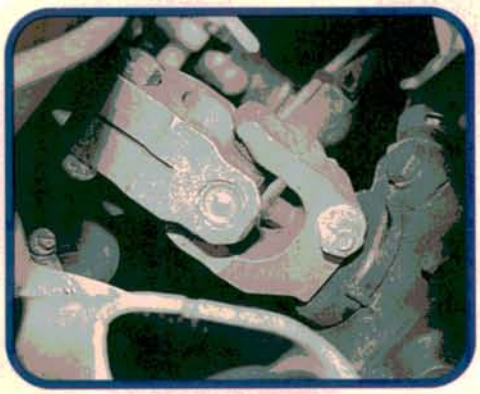
1

Under the car, check the stabilizer links for wear or binding. Some will groan a warning, others simply pop apart. Also check the thrust rod bushings which take an awful beating, especially during braking. To replace them, remove the thrust rods and press out the old bushings.



2

Chamfer the leading edge of the new bushings. Press them into the thrust rods. Put the arrow on the bushing next to the boss on the arm. Reinstall the rods, but don't finish tightening the bushing bolts until you lower the car onto stands or an alignment rack. Final torque the bolts with the car at normal ride height.



3

If the steering is stiff, check the universal joint at the bottom of the steering column shaft. (Don't forget to check other hard steering possibilities like low tire pressure or bad upper strut bushings.) The coupling is not repairable.

4

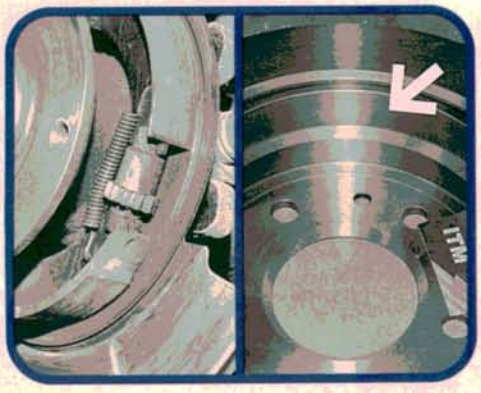
The label on the side of the air compressor says Behr. Belt replacement is just that—a bear. Even with the compressor pivoted all the way against the mounting bracket, the belt doesn't want to go on. We finally unbolt the whole compressor and tilt it inward to start the belt on the pulley.

5

Alternator and power steering pump belts are a lot easier, thank goodness. Each of the accessory belts is adjusted by loosening the pinch bolt at the adjustment end, and turning a hex attached to a gear in a track. Turning the gear moves the component along the track until the belt is properly tensioned.

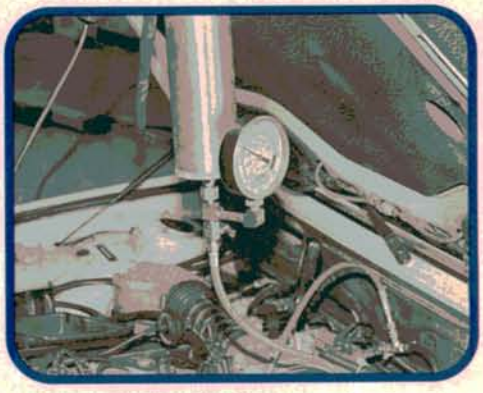
6

Motor mounts can crack and crumble on 5-series cars. Look for the steel shell encasing the rubber center to crack from fatigue or vibration. On cars with a ground strap running between the right motor mount bolt and chassis, check for a tight, clean connection.



7

A few notes on brakes. The hand brake shoes contact the inner surface of the rear rotor hubs. There is an adjustment for shoe to hub clearance. The original shoes are in good shape, but the cable connections and adjusters needed to be cleaned, freed up, and lubed. Adjust the shoes through a lug bolt hole.



8

This car has had a history of valve deposit problems. After running two cans of injector cleaner through the fuel rail, we also hook up the GFG-90 shown in last month's 4 gas follow up and clean the intake with atomized water. The heavy deposits on the tips of the old plugs tell us we've done some good.

9

There are a number of things to look for in the electrical problems column. Distributor caps and rotors should be checked for normal deterioration or cracks at about the 45,000 mile mark. Also check the plug wire ends for corrosion. A new cap and rotor made a big difference in the way our engine ran.

10

Check the adjustment of the throttle position switch. There are three pins in the TPS. Here we check for continuity between the left and center pins at idle. Then check from the center pin to the remaining pin for continuity at wide open throttle. Make sure to use your POZIDRIV™ on the TPS retaining screws.

11

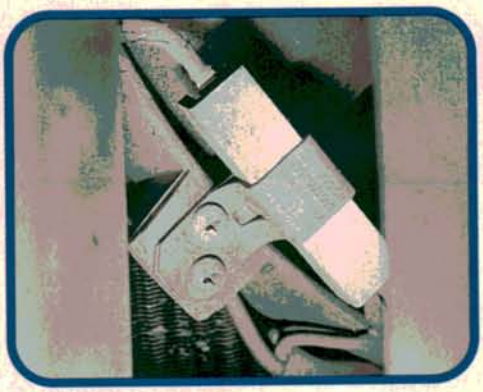
An absent minded door lock heater control unit can stay on and burn out the door lock heater for the driver side door lock. This control unit sits next to the door handle linkage in the driver's door. If the unit stays ON (and the coil hasn't burned out yet), the outer door skin will get hot to the touch.

12

Clean ground connections are extremely important on this car. This main bundle attached to the chassis with the main battery negative cable is especially vulnerable to corrosion. Also check the multiple ground at the stud on the cylinder head, and the large cable at the right motor mount.

13

Check for corroded connections at the main and fuel pump relays mounted next to the fuse box (or Power Distribution Box as BMW calls it). Intermittent main relay voltage drops can be a real joy to track down. Also check fuses for clean, tight connections.

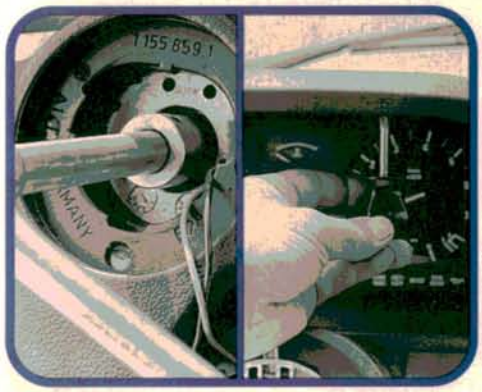


14

Check the auxiliary fan (in front of the radiator) for proper low and normal speed operation. The external resistors on the fan can fail over time. There are two types of resistor used, this ceramic type (Bosch) and a newer finned aluminum type. They mount differently, and aren't really interchangeable.

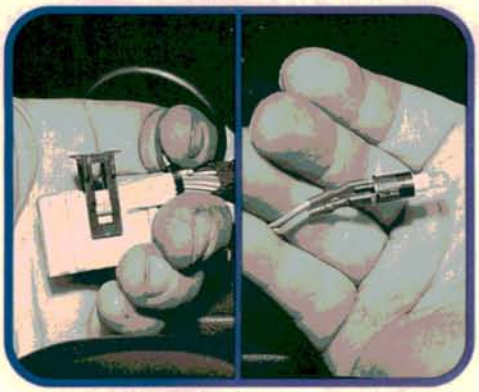
15

Failed dashboard SI boards have been a common problem. The original Nicad batteries fail causing erratic temp and fuel gauge operation as well as other electrical strangeness. In the final photos of this article, we'll walk you through replacement of the SI board. Please use a static strap throughout.



16

Remove the steering wheel (22 mm socket). Lay a soft towel over the steering column so you don't scratch the face of the cluster. Remove the two small Phillips™ screws at the top of the cluster, and gently pry down on the top of the cluster housing as you tilt it toward you away from the dash.



17

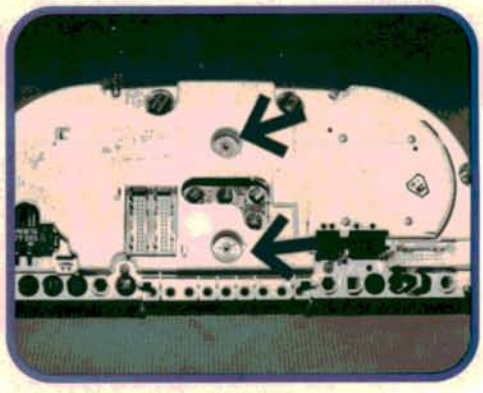
There are several electrical connectors on the back of the dash. Pry up the black locking tab on each main connector. Then remove the connectors from their sockets. Lift the small black locking bracket from the left side of the board and remove the small blue connector. We also removed one bulb/socket.

18

Take the assembly to a workbench. Remove the perimeter screws holding the dash assembly together. Lift off the clear gauge cover. Lay the cover aside away from dust and dirt. Be careful with the fragile needles on the gauges, and be careful not to smudge the gauge faces or clear cover with finger prints.

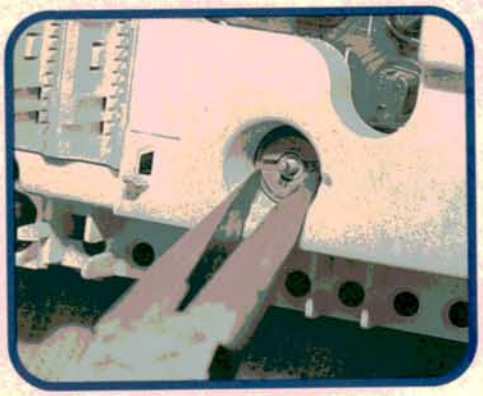
19

The speedo head, tach, and fuel/temperature gauges must all be removed and transferred to the new SI board. The tach is held by a locking tab. Pry the tab to one side as you remove the tach. Gently wiggle the speedo head off its pin connectors being careful not to bend any of them (arrow).



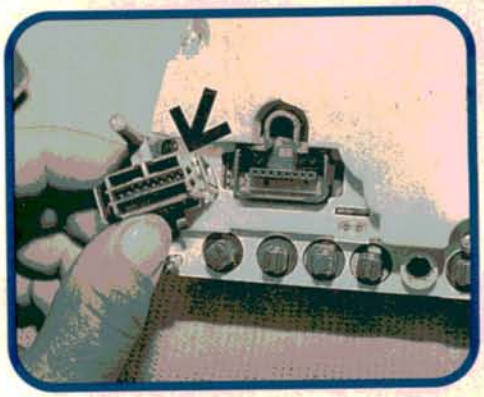
20

This overall view may help you get your bearings as we look at the back of the dashboard plastic cover. The tach is to your left, the speedo head to your right. Fuel and temp gauges are in the center. Note the location of the slotted nuts which hold the gauges in place (arrows).



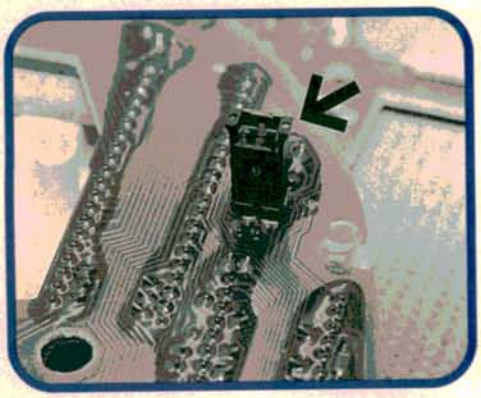
21

Remove the 5.5 mm screws (a 7/32 socket will work in a pinch) holding the fuel and temp gauges, and the washers below them. Then use needle nose pliers or a similar tool to unscrew the round slotted nuts below the washers. Alternately push the two studs on the gauge assembly until it pops out of the board.



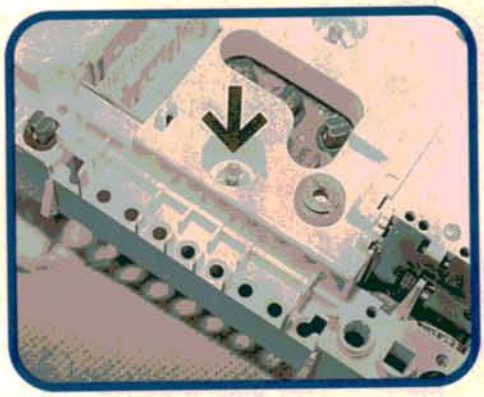
22

When you get down to bare SI boards, lay them side by side and transfer all bulbs, hole for hole. Use the BMW bulb removal tool or needle nose pliers. Twist the bulbs into the new sockets. Also transfer the coding plug to the new board (arrow). Squeeze the tabs on the sides of the plug and pull it off.



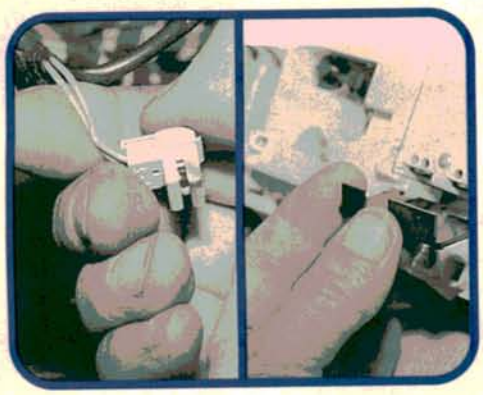
23

The new board comes with a small bridge connector which must be installed on the two tiny pins below the tach. Do this before you reinstall the tach. This connector powers up the new board and readies it for use. There should be an instruction sheet inside the box with the new board.



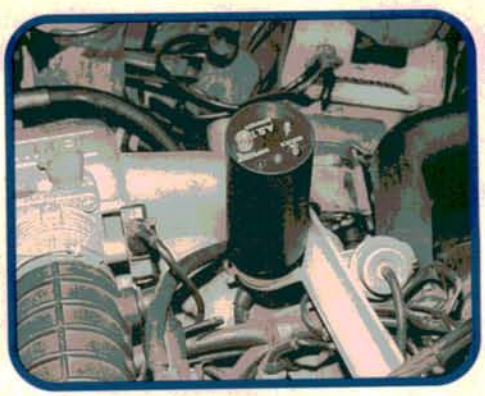
24

Reinstall the tach and speedo heads being extra careful to align those skinny little pins with their mating sockets. The new board is a slightly different design and doesn't use the slotted nuts we removed earlier. Use the hex nuts and washers removed earlier to fasten the gas/temp gauge assembly.



25

Back at the car, reconnect the instrument wiring. Replace all connectors (color coded). Push the main connectors squarely into their sockets and press down the locking tabs. Don't forget the small blue connector. It can be tough to plug in by feel alone. Push in the black locking slide over the plug.



26

With the cluster in place, reinstall the steering wheel. Reconnect the battery, and turn on the ignition. Reset the maintenance reminder lights as you normally would after a maintenance. Then check the function of all the electrics in the dash—bulbs, gauges, and so on.