

Someone once suggested that heater cores were the first part selected from the parts bin during the assembly of a new car. In many cases, it seems that the heater core is placed in the middle of an open work area, and then the remainder of the car is built around it.

Suggested repair times for heater core replacements support this theory, with many flat rate listings for heater core R&R equalling the times allotted for a transmission overhaul. As a result, many of us have winced at the very mention of these repairs, knowing full well that the complexity of an entire dashboard

removal creates a lot of possibilities for error.

This month, we'll tackle a heater core replacement in a 1984 BMW 733. The recommended book time for this operation is nine hours — which is a long day in anybody's book. This is the kind of job you want to do once and once only.

To make things even more fun, many repair manuals simply gloss over the specifics of a heater core replacement. And much of the brief information they offer can lead you astray. When it comes to a repair requiring major disassembly of a car's interior, your own instincts are usually better than the repair manual.

Cores

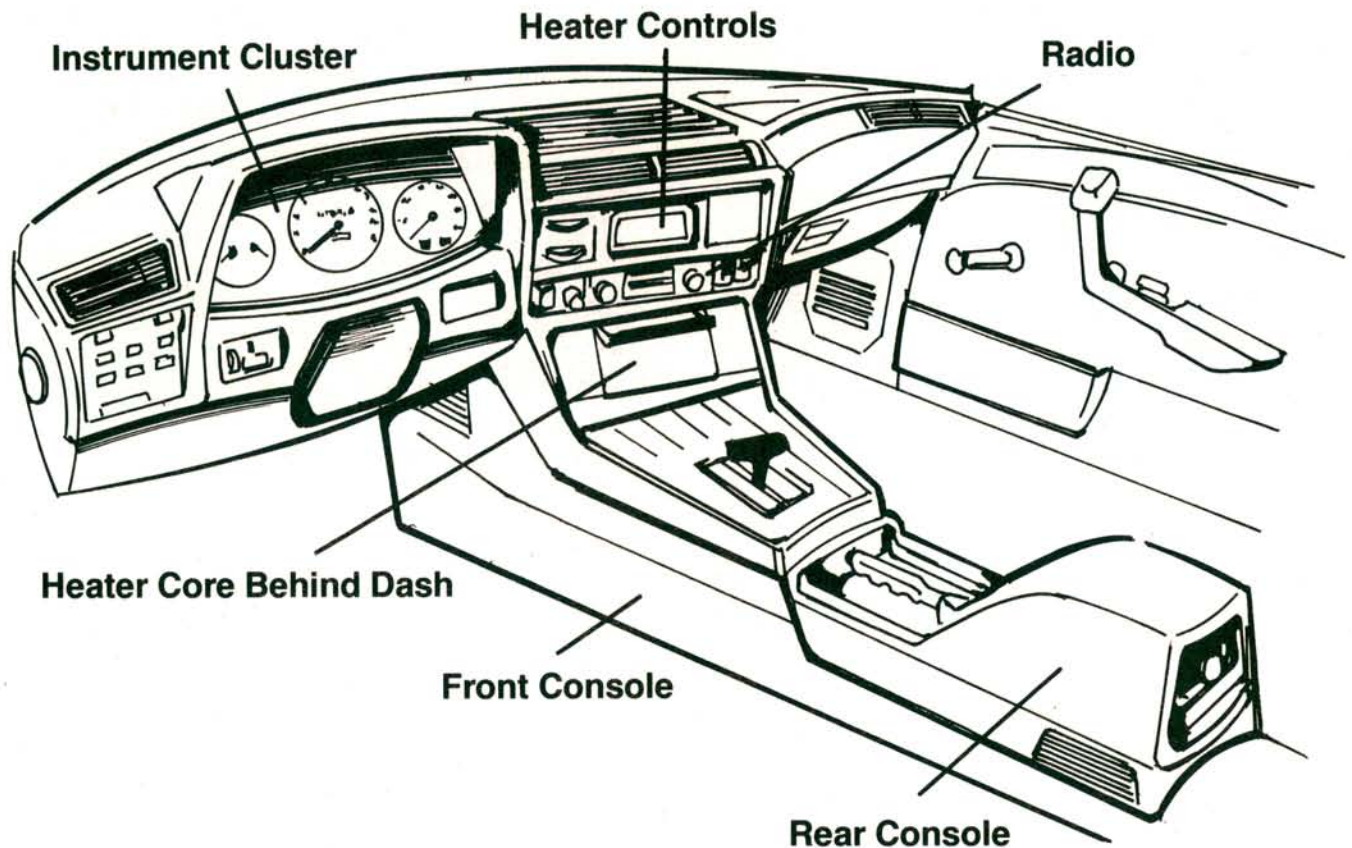
To Remove — Or Not to Remove

I've seen many technicians over the years who got themselves in a lot of trouble, not because they removed too many parts, but because they removed too few. In an effort to shortcut the job, they often ended up making the job more difficult by working around annoying obstacles they could have removed.

Just as importantly, many of the trim pieces in a car overlap, and prying or tugging on a trim piece in an effort to "dig it out" from beneath another, can result in a bent, scratched, or broken trim piece. Priced any trim pieces lately?

radio, and heater controls from the dash, we unbolt it. But the mounting studs in the dash cover pass downward through mounting holes in the metal underdash support. As a result, the dash must be lifted upward to be removed. Unfortunately, the A-pillar trim pieces sit on top of the dash, and they must first be removed before you can lift the dash up and out.

- **Each A-pillar trim piece snaps to the A-pillar with two metal clips, and is screwed to the top of the A-pillar at the roofline.** That means the header trim panels must be dropped to access the screws, allowing you to remove the A-pillar trim panels without damage.



Here are some good examples of how the "knee bone connects to the thigh bone" in this particular repair:

- **The heater core in this car is located in the main heater distribution box, just ahead of the ashtray in the center console.**
- **The plastic cover in the main distribution box which covers the core is removable.** But it's held captive by a T-shaped metal body stiffener which bolts to both the underdash body support and the floorpan tunnel.
- **The T-shaped stiffener is held captive by the dashboard cover.**
- **The dashboard cover bolts to the body.** After removing the steering wheel, instrument cluster,

- **The center console must also be removed.** It is a long, two-piece console, extending from the base of the dash to the rear seating area. The rear section of the console contains the power window and seat adjustment controls and the rear seat A/C duct work.

This may seem like a lot of R&R to get at a heater core. But by removing pieces in their proper sequence we feel we actually saved time. Working room at the heater core was improved, and none of the trim was damaged. Except for the time spent on photography, the job was completed in book time.

— By Ralph Birnbaum

A Plan of Attack

Here are some things to consider before you start a complicated dashboard removal:

- **Verify the complaint.** Since a visual inspection of the heater core is often impossible, do what you can to make sure the heater core is really leaking. A pressure test is often a good starting place, accompanied by a search for wet carpeting in the heater core area.

Document any related problems with the heating system.

Our donkey car was fogging the windshield in defrost mode, and the cabin was filled with the unmistakable odor of coolant. But an additional problem was noted: occasionally, the air flow would switch from heat to defrost with no driver input. (Knowing about this additional problem in advance kept us on the lookout as we proceeded with the repair, and led us to a simple solution. See step 20 on page 14.)

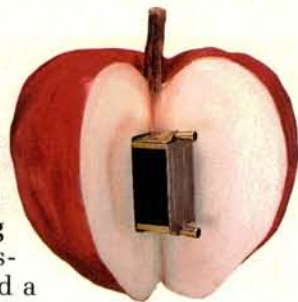
- **Find out what does and does not work on the car before the teardown.** If the radio doesn't work before you start the job, document that information and share it with the customer. There's no sense in getting blamed for something for which you weren't responsible.

- **Ask the customer to remove his personal belongings from the vehicle before starting the repair.** Many customers who can't afford a

safety deposit box, leave a startling assortment of personal belongings in the glovebox. In addition to the normal mountain of cassette tapes and bank deposit slips, many of us have been forced to handle loaded weapons and — let's call them "controlled substances." The liabilities aren't worth it.

- **After completing the repair, reset the radio presets and clock. Then take the customer for a test drive.** Have him verify that all dash controls, (radio, lights, wipers, cruise control, trip computer, etc.) are working as they were when the car first arrived.

If you did repair the radio during the repair by tightening a ground or cleaning a connection, inform the customer, and take your justly earned credit for a job well done. A little extra cash is even better than credit.



Cores



1

First, we disconnect the battery negative cable. Then, rather than draining the entire cooling system, we save a lot of time by pinching off the heater core coolant hoses. Then we remove the air intake grille and control flaps from the cowl so we can disconnect the hoses at the metal heater core feed tubes.



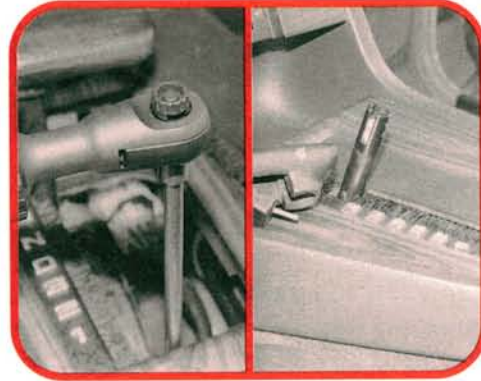
2

The rear section of the center console is wedged up tight against the front console section, which is in turn wedged up against the dash. (The old domino effect.) We remove the A/C grille, unplug the wiring, and unbolt the rear of the console. After unbolting the front mount, we slide the rear console up and away.



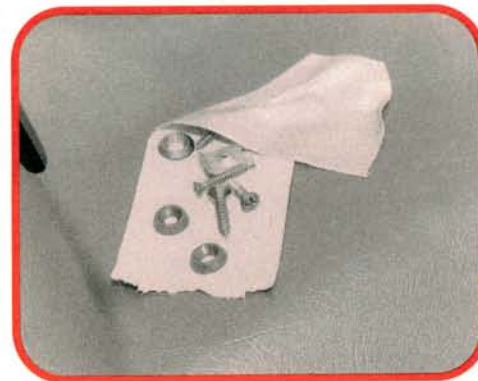
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This is one of those optional steps that paid off in added working space. We popped the window switches upward, and disconnected the wiring plugs. The harness to the switches is short, and kept us from moving the console rearward, fully out of our way. This step took only a minute or two.



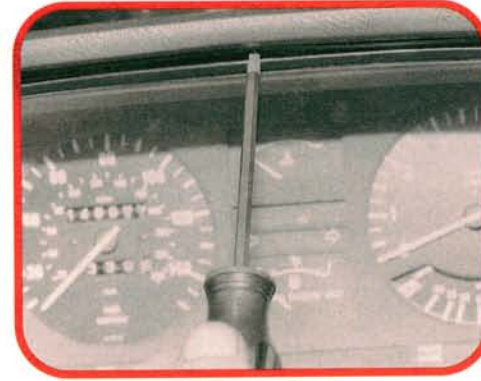
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The front console section wraps around the dash, so there were quite a few small screws and anchor bolts to remove. The front console main mounting bolt is accessible beneath the shifter trim. The shift handle is held to the selector arm by a small recessed hex head screw, and comes off easily.



5

We're starting to accumulate enough screws to open a small hardware store. The location of some screws is very important due to their different diameters and lengths. Rather than dig through a coffee can of fasteners later, I use a length of duct tape to keep the screws with their respective panels.



6

Next, we center the steering wheel, unbolt, and remove it. The instrument cluster comes out easily. Remove the trim bezel screws as shown, place a soft cloth on the steering column to protect the clear face of the cluster, and tip it toward you. Then remove the electrical connectors. There's no speedo cable.



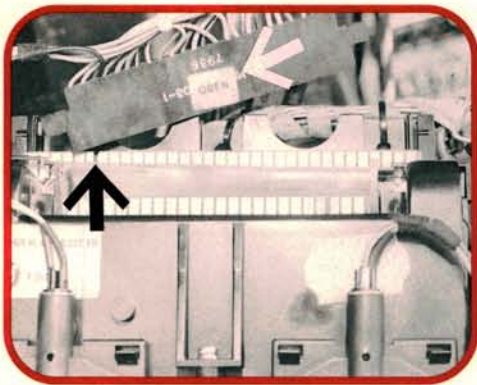
7

Radio removal is also easy. One lock tab on either side of the radio holds it in place. After releasing the lock tabs, we slide the radio out and disconnect the antenna, power, and ground leads. Note the position of the two speaker connector plugs. It is possible to swap them if you're not careful.



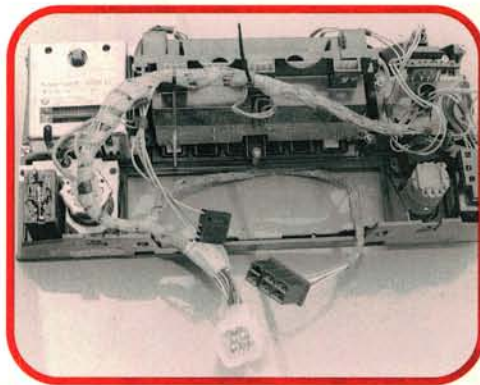
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The heater control/trip computer module brings up a good general rule of thumb for dash work: You don't need to unplug every single wire and bulb to remove some modular components. Find the main, multipoint connectors which feed the modules, and disconnect them instead. This saves a lot of time.



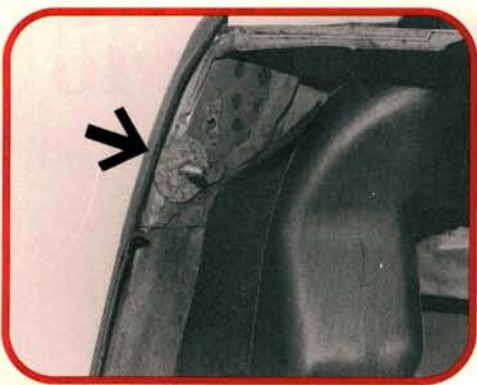
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The edgeboard connectors are also marked for top (Oben), and each has a locator pin and corresponding slot (arrow) to ensure proper realignment later. Don't worry about marking each main connector plug for location. Each is designed to fit only one receptacle.



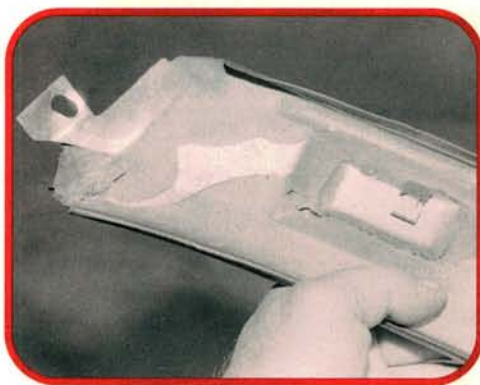
10

Here's the backside of our heater control/trip computer module. By finding multipoint connectors feeding smaller wires on the module, we eliminated a piece-by-piece disassembly of all the wiring. Only main plugs have been removed, and their locations are easily identified later.



11

The dashcover unbolts from below the dash. Most of the studs are accessible, but reaching the one at the front left of the dash requires removal of the side vent. Darned if I could figure out how to photograph the studs in the car, but here's what they look like out of the car. Don't lose the felt washers.



12

Before we can lift up on the dash, we need to remove the A-pillar trim panels which sit on top of the dash panel edges. Each panel is held in place by two snap clips and one mounting screw which passes through the metal hole in the panel (at the left of our photo). The clips are real fighters.

Cores



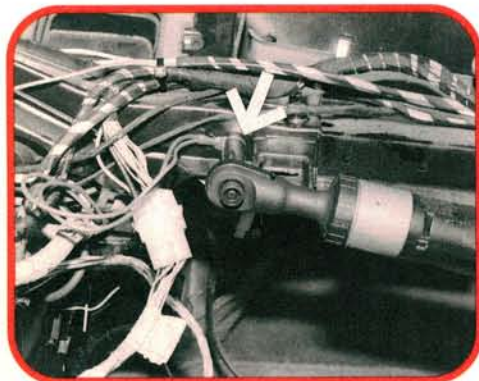
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To reach the screws, we remove the sunvisors, side headliner trim panels, and drop the corners of the front headliner trim panel. Then we fish a screwdriver through the sunvisor hole and remove the screws holding the upper part of the A-pillar trim pieces to the body.



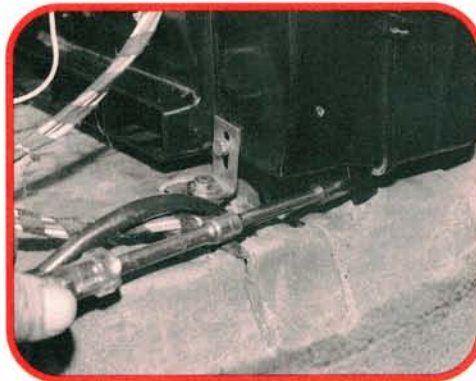
14

We lift the dash up and out of the car to expose the T-shaped body stiffener bar which bolts across the center of the car. These two bolts at the base of the bar are accessible after you pull back the carpet and insulation. The vertical leg of the stiffener holds the heater core cover captive, so it must be removed.



15

The T-shaped stiffener also bolts to the metal underdash support to the right of the steering column, and to the left of the glove box. A total of six bolts must be removed, including this one which is also a ground point. You may want to tape the eyelet to the bolt so you don't forget it.



16

The elusive heater core is getting very close. We unbolt the vacuum solenoids from the cover and tie them up out of our way. There are a couple of screws on either side of the heater core cover, and the front heater box mounts (arrow) are also removed. Then we snap off the cover clips and pop the cover.



17

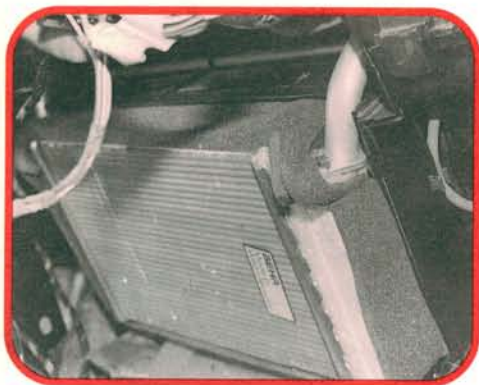
Our new heater core comes with new metal feed tubes which will connect it to the rubber heater hoses out in the cowl. The tubes fish upward from the core through holes in the main heater box, and exit through two rubber sealing grommets in the cowl to keep water out of the cabin.



18

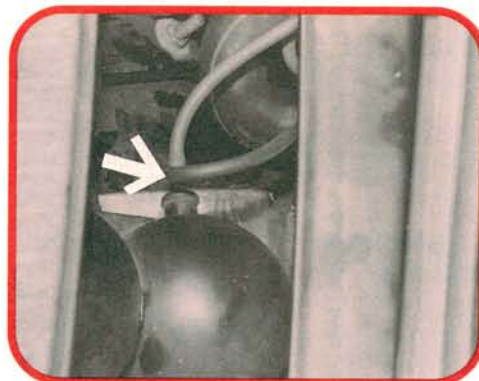
Fish the tubes up through the holes and the rubber grommets in the cowl. Inside the car, leave them sticking out just far enough to let you bolt the tubes to the core. (Lightly lube and install new o-rings on the tubes). A notch in each tube and mating bosses in the bores will properly align the tubes in the core.

Cores



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Now we can push the core into the heater box. But before we button things up, we'll go out front and reconnect the rubber hoses to the heater core feed tubes. Then we'll fill the cooling system, remove our clamps, and pressure test. If we did pinch an o-ring, or the new core leaks, now is the time to find out.



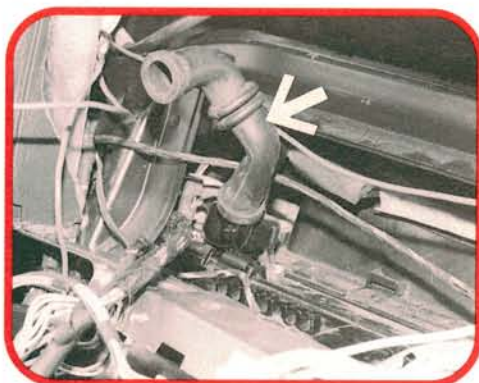
20

When we reach down in the cowl to attach the hoses, we notice that the vacuum tee at the vacuum tank looks old and cracked. As we wiggle the connection, we hear the hiss of leaking vacuum. As it turns out, a new vacuum tee repairs our intermittent problem with the heater and defroster doors.



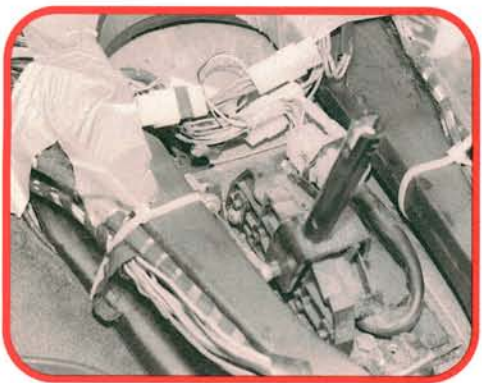
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Here are a few random hints to keep in mind as we reverse our steps, and start reassembling the car: The top A-pillar mounting screw on the right side is also a ground connection for the passenger sunvisor light. Don't forget the screw, or leave the wire up in the headliner.



22

There's a rubber tube connecting the air sensor vent in the heater control module to the main heater box assembly. It's a little tricky getting it pushed back in place. Removing it from the heater box and connecting it to the heater control module first seemed to make things a lot easier.



23

At one point, we found that cutting the original factory tie wraps gave us some extra slack in the harnesses and more working room. Now we're careful to reroute the harnesses in their proper locations, tie wrap them in place, and add a few strips of duct tape so they don't move as we reinstall the console.



24

Finally, the clips on the intake air doors are a little tricky to install. Removing the flaps takes some wiggling and twisting, and you may not remember exactly how the mechanisms attach. This photo shows the relative position of the activator arm and its attachment point. Now. Wasn't this fun?