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Not-so-tiny trim: What started out as a simple plastic trim piece (lower right) has become an angled speaker enclosure for a '92 Mitsubishi Eclipse (left). The original trim is hard to tell from the dupe (lower left), which is made of fiberglass and resin.

Kick It

WHEN YOU WANT A GREAT SOUNDSTAGE, ADDING KICKPANELS IS A GOOD WAY TO GO

THERE'S NOTHING LIKE THE EXCITEMENT OF PURCHASing a new car. It's as shiny as can be, spotless on the inside, and there's no lingering fast-food smell from the previous morning's hasty on-the-road breakfast. The ride from the dealership to the stereo shop is only a few blocks, and you know for sure that great tunes will perfectly complement your new machine. You're starting to get excited as you discuss installation options with the guy designing your custom system when a concerned look crosses his face. "I don't like the location of the front speakers in this car at all," he snorts, pulling at his goatee and furrowing his brow. "They're too low and they point directly at each other." Your stomach turns as you imagine having to live with (gasp!) the factory sound system. "Ah-ha! I think I have a solution!" the salesman optimistically remarks. "We'll build kickpanels for you." "Build what?" you ask. "Kickpanels, dude! Let me show ya . . ."

THE POD SQUAD

Sometimes, car manufacturers anger car-stereo enthusiasts by locating speakers in places where they aesthetically fit the design of the vehicle interior but completely thwart our sonic desires. Stock speaker locations are typically too low, too far back, or aimed at passengers' legs or the windshield. With each front seat close to one speaker and further away from the other, it's difficult to attain a balanced soundstage. One creative solution to this common dilemma is the use of kickpanel mounting pods—a custom-built appendage located in each front footwell. The concept is to create small enclosures and mounting surfaces for the front speakers and allow them to crossfire symmetrically across the front seating area. Many listeners prefer this arrangement because it

JIM RAYCROFT

BY MICAH SHEVELOFF

Meet the ringleaders: The grille, the baffle, and the original template rings spend a relaxing moment or two with the router bits and holesaws that created them (above); the flush-trim bit is used to cut the grille 0.125 inch smaller in diameter than the baffle and template rings above it (below).

Kick It

let me sit in on a class at Richard Infererra's Team of Professionals (AKA R.I.T.O.P.) installation school and observe pods being constructed for the purpose of installing a pair of MB Quart QM 100.03 KX 4-inch coaxial speakers in a 1992 Mitsubishi Eclipse.

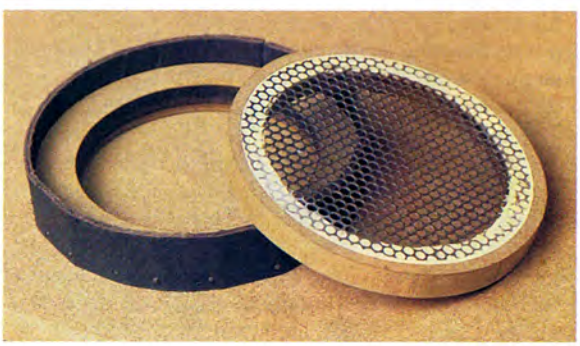
GENERATION NEST

The crucial first step in the kickpanel process is to determine the best possible location for the speakers. Me, I like to make a nest of packing foam or put a pillow in the area where each pod would be and place test speakers in the "nest," angling them as they'd be positioned in the actual pods. I hook these speakers to whatever stereo is already in the car, and then I listen. This also allows me to experiment with different mounting angles for the speakers and make absolutely sure that pods are the right solution for the vehicle. Once I'm comfortable with how to position the speakers, measurements must be taken so that the exact mounting positions and angles can be duplicated later on. Next, I'll inform the customer of their options and allow them to select a speaker that'll fit the pods. These are the necessary steps leading up to building kickpanels and creating the ultimate soundstage.

Most cars have plastic trim of some kind over the kickpanel area. The first step in constructing pods is to decide if this trim will serve as the foundation for the project—and thus be sacrificed—or whether duplicate pieces need to be fabricated out of fiberglass. In my opinion, there's no sonic advantage either way. However, making duplicates spares the originals so that they can be reinstalled if the sound system is later removed. Duplicates of the kickpanel trim pieces can be constructed by using the originals as molds. The originals are first sprayed with a generous layer of a lubricant called mold release so that nothing can stick to them. Next, squares of fiberglass mat are cut large enough to cover each of the panels, and the mat is saturated with a mixture of resin and hardener. Once the mats are soaked, they're spread over the original panels and carefully folded around all of the contours so that when the resin mixture completely hardens, the fiberglass mats are exact

more closely resembles listening to music in the home environment where the speakers are facing them instead of dealing with speakers pointed at awkward angles, as is sometimes the case in vehicles. It also places the speakers at equal or nearly equal pathlengths—the length of the path the sound from the speakers has to travel to listeners' ears. Depending on the application, kickpanel pods could take up some of the room intended for passengers' feet, so care must be taken to conserve space when building them.

Building kickpanel pods can be a labor-intensive, time-consuming custom DIY project, though there are companies like Q-Logic (405-624-6722; www.airesearch.com) who make it their business. It's easy to see why: Although kickpanels represent an increase in the price of an audio package, they can mean the difference between a stellar car stereo and a so-so car radio. For this article, Rich Infererra of Rich's Car Tunes in Watertown, Massachusetts was kind enough to



Baffle house: Kevan R. Budrow attaches waterproof panelboard to the outside of the baffle, creating a recessed area for the grille ring to fit into (left); the perfect pair—the grille ring with its steel mesh leans on its soon-to-be companion, the baffle ring (above).

duplicates of the factory trim pieces. The originals separate easily because of the mold release, and, with a little filing and sanding, the duplicates are complete.

RING JOB

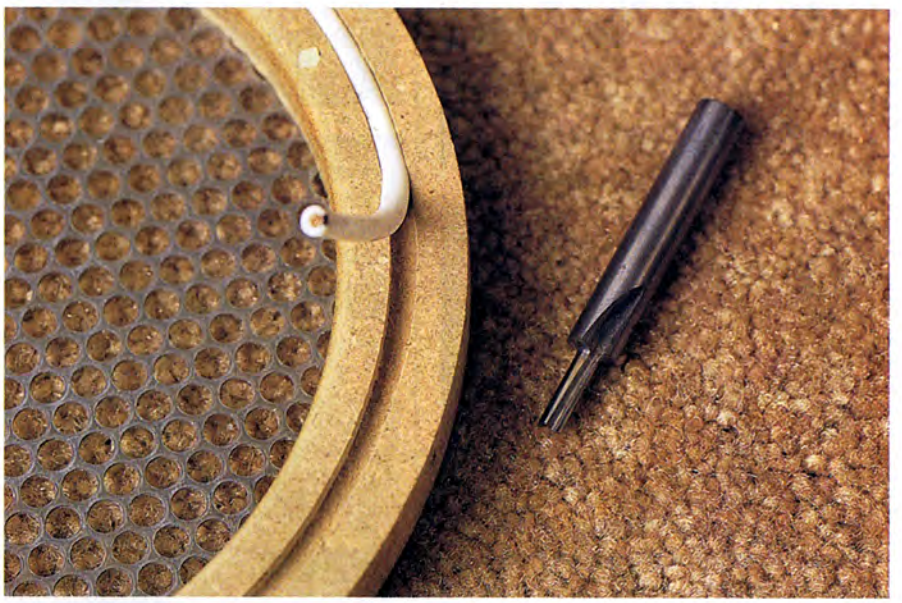
The remaining steps are virtually identical from here on regardless of whether the original kickpanel trim pieces are used or duplicates are constructed. There are some special tools required for this process, so beware—inexperience in using a router or hole saws could lead to injury. (I'm going to use the router to build my rings for the speaker and grille, but hole saws are another option.) So please proceed carefully. If you're not up to the task, consult a professional installer.

Once speakers are selected for the pods, rings—2 for each speaker—must be cut out of 0.5-inch medium-density fiberboard (MDF) to create the baffles that hold the speakers and the grilles that cover them. (The procedure will be slightly different if you're installing component speakers instead of coaxials.) The grille will be 0.125 inch smaller in diameter than the baffle, allowing it to fit inside the assembly you're building. A flush-trim bit is used in the router to create the baffle, and another flush-trim bit with a smaller bearing is used to make the grille. A ⅛-inch roundover bit is suggested to put an attractive inner edge on the grille ring only.

The baffle ring is set aside while we fabricate the grilles. A ⅜-inch rabbet bit is used to carve out a recess in the top of the grille ring. This is for a circular section of steel mesh that will serve to add strength to the grille and protect the speaker from physical damage. The mesh must be adhered to the ring using contact cement. Once the cement has hardened, the edges of the grille are made smooth with autobody filler and a few strokes with sandpaper. The router must be used one last time on the grilles, loaded with a ⅛-inch straight bit. This bit is used to cut a groove in the underside of the grille, which serves as a catch for the grille cloth during final assembly. After the grooves are cut, the grilles are set aside for the time being.

BAFFLE LIFE

Back to the baffle rings. These rings are the keys to assembling the kickpanel pods. The first step in constructing the baffles is to cut strips of waterproof panelboard. The width of the strips should be exactly that of the grille and the baffle rings stacked together (in this case, 1 inch). The strips must be attached to the circumference of the baffle ring using a narrow-crown electric or pneumatic stapler. This creates a border around the baffle into which the grille ring fits quite neatly. Once the panelboard is securely fastened, the baffle assemblies (the baffle rings and panelboard) can be mounted on the plastic kickpanels, which is accomplished by using scraps of the panelboard as stilts and a generous supply of hot glue. This step is critical for correctly aligning the baffle rings true to the test measurements done earlier with the packing foam or pillow, and making certain that the basket and magnet structure of the loudspeakers are accounted for and will fit within the pods. The stilts and glue have little impact on the strength of the pods,



Rabbet tricks: The rabbet bit is used in the router to carve out a recess in the grille ring for the steel mesh, which is held in place with contact cement (top); the ⅛-inch straight bit is used to cut a narrow groove in the underside of the grille ring (middle); 16-gauge wire is pressed over the grille cloth and into the groove to secure the cloth in place; the baffle ring is carefully affixed to the kickpanel trim at precisely the correct angle just before the entire assembly is covered in cloth (left).

Kick It

which is determined as the process continues.

Once the baffles are secured to the new kickpanel trim pieces, they should be test-fitted to the vehicle and the speaker angles double-checked. This is also an excellent time to plan how the finished pods will be attached to the car. The plastic pushpins that are often used to hold the original kick-panel trim pieces in place can be secured with epoxy into their original holes, but this must be done *immediately*, before the entire assemblies are covered and the holes become inaccessible.

Once these engineering challenges have been overcome, the kicks can be placed on the workbench and covered in grille cloth. This type of material works well because it stretches nicely over odd angles. Before the cloth is pulled over the kickpanel pieces, it should be anchored on one side with a spray adhesive so that it can be stretched snugly and evenly over the entire assembly. If the pods create a compound angle (a natural inward slope), the grille ring should be inserted into the baffle over the layer of cloth to insure that there are no gaps between the cloth and the baffle surface.

Wrap artist: Spray adhesive is used to anchor the cloth as it's stretched over the baffle and kick–trim assembly (above); 2 coats of fiberglass resin mixed with hardener are evenly applied to the cloth to strengthen the entire structure (below).

The Sandman cometh: Imperfections must be completely sanded out in order to leave an ultra-smooth surface to finish (above); cloth is stretched over the ring, and wire is inserted in the groove to hold it in place (left).

This process should create a smooth, cloth-covered module ready for the application of 2 generous coats of a fiberglass resin and hardener mixture. The mixture should be evenly applied with a brush over the entire cloth-covered surface. Extra care must be taken to keep the resin off of the grille ring if it's been inserted into the baffle.

With the 2 coats of resin completely hardened, the grille rings should be removed, and the sections of grille cloth over the speaker holes can be cut out. This creates access inside the hollow modules. Setting the pods at different angles, several ounces of resin are poured inside the structures, adding tremendous strength and rigidity. Not only will this allow the pods to survive the real world, it prevents them from "ringing" or being "excited" by the speakers. After each pour, the assemblies must remain still while the resin is allowed to harden. Autobody filler can be applied to the exterior surface to alter the shape and make the right and left pods exactly symmetrical. After the sculpting process has been completed, the outside of the pods must be continually sanded until they're perfectly smooth.

THE FINISH LINE

There are numerous ways to finish kickpanel pods. They can be painted, which requires a primer, or they can be covered in vinyl, leather, or cloth. Once a finish has been applied, the nearly completed pods can be set aside so that grille cloth can be affixed to the grilles. Two pieces of cloth are cut just a bit larger than the grilles, and stretched over the front surface. The cloth must be folded over the edge of the grille where the 0.125-inch groove was cut with the router. A section of 16-gauge wire is inserted over the cloth and into the groove with a roller, where it captures the grille cloth with definite authority. This system works magnificently because it allows for easy replacement of the cloth if it becomes soiled, an unfortunate likelihood of life on a kickpanel. Once the grilles are completed, the speakers can be mounted to the baffles, wired through the rear of the pods, and the entire assemblies mounted in the car. The grilles should fit tightly in place. However, Velcro can be used on the underside of the grilles to hold them in place. All that remains to do is to stand back and admire! And, of course, listen.

Pod, people: A finished pod in the kickpanel (above) and the original before the install took place (top). Note that the speaker hardly protrudes into the passenger's personal space.

KICKPANEL PODS AREN'T NECESSARY IN every system, and building them takes time and patience. They can provide an exceptional soundstage in cars that haven't been blessed with decent factory front-speaker locations. The kickpanels' mission is to place you smack in the middle of a wonderful illusion, that moment when your stereo system becomes alive and your favorite performer is suddenly singing to you from the hood of your car. Careful now, keep your eyes on the road! ■