OBJECTIVES

- Define the unique “Tools of the Trade” for car audio.
- Discuss the different methods or approaches for finding out how to disassemble a vehicle for an audio install.
- Describe the removal of different types of components in the disassembly of a vehicle for an audio install.

INTRODUCTION

The Challenge for Installers

Interiors of modern vehicles are much like pieces of a puzzle in the sense that each interior part generally fits only one way in only one place. For most installers of aftermarket mobile electronic equipment, the greatest challenge lies in the removal of interior panels and, more specifically, how to judge the way in which the panels are attached in the first place. Often, the biggest hurdle for an installer (who is new to the hands-on part of the job) is trying to determine just where panel clips, screws, or pressure release points are without “tugging” or “yanking” on a panel so hard that it breaks. Some amount of “investigative” panel pulling is required to reveal points at which the panel has a mounting clip or screw. The challenge then becomes “how much is too much” before the install shop becomes responsible for a damage claim on a broken interior panel.

Tool of the Trade

The Tools of Panel and Trim Removal

Briefly, there are several specific tools that make the job of investigating the panel attachment much easier. Many of these tools are specialty hand tools common to the mobile electronic installation trade and other tools involve common sense and new technology.

Panel Removal Tools

The common name of “panel popper” describes the tool’s ability to apply pressure in just the right area to release the panel clip without damaging the panel or the surrounding trim.

A large flat blade screwdriver does NOT function as a panel popper and will likely damage the panel snap, the surrounding trim, or both. DO NOT USE SCREWDRIVERS AS PANEL REMOVAL TOOLS!

The variety of Panel Removal Tools shown allow easy removal of interior panels such as door panels and threshold panels while avoiding unnecessary broken mounting clips.
Pick Tools

Pick tools are used for more delicate aspects of panel removal such as dash trim panels or hidden screw covers on other interior components. The width of the smallest pick tools allows them to be inserted into a small opening or seam to assist in prying the panel free from its location.

Pick tools work well when releasing pressure fit clips, but should not be used to remove a panel that has a screw (probably a hidden screw) holding it in place.

Window Crank Removal Tool

The Window Crank Removal Tool is a handy tool that allows for easy removal of the “horseshoe” clip responsible for holding most manual window cranks on. Certain vehicles have a Phillips type screw holding the crank to the spline shaft, but most window cranks are held on with a simple retaining clip.

Removal of the window crank is as easy as inserting the fork shaped end into the window crank space between the base of the crank and the door panel. Insert the tool into the side of the window crank that has two clip edges showing rather than the side with one continuous clip edge.

Scosche Skewdriver

The Skewdriver is a popular tool with installers due to the versatility of both the angled head and removable bit tips. Any standard screwdriver bit (such those used in screw gun tips or ratcheting screwdrivers) can easily fit into a Skewdriver head. The slim profile allows the tightest of spots to be accessed.

Stubby “Fingertip” Screwdriver

The finger tip stubby screwdriver is simply a smaller version of a palm held stubby screwdriver. These allow manual turning of light duty screws in very hard to reach places. The added benefit of the finger tip design is that only one hand is required to operate the tool.
Palm Ratchet

The palm ratchet allows access of a ratchet into tight spots that might be otherwise difficult to fit a normal socket wrench into. Like the finger tip screwdriver, the benefit of the palm ratchet is that it requires only one hand to operate.

Common Hand Tools

More common hand tools are also needed for basic interior panel and trim removal. Although these standard tools are found in most tool kits an installer would purchase, it is generally not the type of tool that the employer supplies. These include (but are not limited to) the following items:

- Battery Operated Drill with a Magnetic Screw Bit Tip
- Screwdrivers (Phillips, Straight, and Torx)
- 1/4” and 3/8” Ratchets
- A selection of shallow and deep sockets (Both SAE and Metric sizes)
- A selection of Torx sockets (for seat belt and supplemental restraint removal)
- Needle nose Pliers
Panel Removal Process

Common Sense

Asking Questions

Common sense in the installation bay means the installer must be asking questions when he/she has reached a point in the installation where they are unsure or suspect proceeding any further may involve unnecessary vehicle damage. The individuals to direct questions to are colleagues and supervisors who have a longer tenure in the install bay and have a wider range of experience from which to draw.

Simply stated, there are relatively few reasons an installer should not be able to ask for guidance from a colleague or supervisor. Guidance won’t ask the colleague to do it FOR the installer, but guidance allows the installer to benefit from the experience that other installers may have encountered thereby reducing the redundancy to the “learning curve” on each individual vehicle.

While there will be questions on a number of installation challenges, interior panel and trim removal questions are frequent because each vehicle interior is different, even within the same brand. Where electrical similarities occur quite often across a particular brand of vehicle, interior panel and trim pieces and the way in which they are attached seem to be vehicle specific most of the time.

Stop, Analyze, and Think

Above all other suggestions, the main component required to implement common sense into any process involves FOCUS. Many times when installers have become frustrated or discouraged by an installation challenge (particularly at the start of an install simply taking the vehicle apart), it is difficult to progress through the problem without first taking time to STOP, ANALYZE, and THINK.

1) STOP - If the job is becoming frustrating, just STOP, step aside, and take a short break for a minute or two.

2) ANALYZE - Take a look at the big picture and make some choices. Maybe it’s best to move to another portion of the install until another colleague can lend assistance or answer a question, or until a Technical Support resource becomes available. To effectively analyze something, an installer must stop and think!

3) THINK - The panel or trim piece has gone in the vehicle somehow, so there’s certainly a way to safely take it back out. Thinking about how something was put together is often the most effective way of taking it apart.

Preparation

Any installation task will go much smoother when the installer is prepared with the information and materials needed to complete the job. If there is technical information available about the vehicle, learn about it prior to beginning the job.

Panel and Trim Attachments

Interior panels and trim have a wide variety of methods in which they attach to various vehicle surfaces such as doors, dashes, or sheet metal panels. What is important to become familiar with is the way in which these panel attachment styles can be manipulated for safe removal without breaking the panel or damaging the integrity of re-attachment. Often, getting a panel or trim piece removed without damaging the clips or other components used to attach it is an exercise in patience and ingenuity. An installer
MUST evaluate the appropriate method of removal by including easy re-installation of the panel or trim piece as a top priority. Removal of interior panels and trim pieces does little good if they can’t be re-attached in the same way the factory originally assembled them. Panels with broken attachment clips or hardware are often the source of customer complaints of mysterious “SCL’s” (Squeaks, Creaks, and Leaks).

**The “Investigative” Approach**

Every installer will run across a vehicle into which they have not installed equipment before. Certain aspects of this fact make an installation task, even simple tasks, take longer than expected. The cause of the problem (if it’s actually considered a problem) is that the installer has limited experience with actual removal of interior panels and trim pieces.

**Experience Makes It Easier**

Perhaps one of the caveats of an installer’s hand-on experience is that he or she will have seen many makes and models of vehicles and found similarities among certain aspects that identify specific clues during an investigation in a new “first time installation” vehicle. In essence, the more hands-on experience an installer has obtained, the easier it is to find the clues for difficult panel and trim piece removal.

**Reverse the Process**

Whether an installer has years of experience removing various interior panels and components or it is the installer’s very first time, there are some time tested methods of investigating the method in which panels and trim attach so that they can be removed with minimal difficulty. Regardless of the method of attachment, the term “investigate” is an important part of the panel and trim piece removal process. With a little time spent assessing how the panel was initially installed, it becomes more evident as to how it must be removed. Essentially, to figure out how it comes off, one must determine how it was put on!

When performing the initial investigation into the method of panel or trim attachment, it is recommended to begin with the small Pick Tools for dash, console, or cosmetic trim type panels and Panel Removal Tools for door panels, rear deck panels, or rear side panels.
Panel Basics

Door and Dash Panel Basics

When contemplating the removal of a door panel, several parts may need to be removed to gain access to critical “anchor” hardware. In addition, the vast majority of door panels use a series of strategically placed pressure fitted plastic clips to hold the outer edges of the panel to the door.

This panel is a common example of many door panels. It uses a felt lined window sash trim, composite construction, an integrated speaker grille, an integrated map pocket (not visible from the back side), and small plastic pressure fit clips around the perimeter.

Door Latch Release Handles

There are many methods of attachments used to secure the door latch release handle. In some cases the handles themselves are integrated into the door and there is simply a cosmetic trim panel surrounding the handle assembly between the door panel. In other cases, the release handle is part of the entire assembly and needs to be removed as a whole part to allow removal of the door panel. If the installer takes a few minutes to look at the assembly and determine if there are multiple pieces or only a single assembly, the method of removal becomes much easier to figure out.

The photos in the 1-2-3 sequence on the following page indicate a release handle that happens to be part of an entire one-piece assembly in a 2000 Toyota Corolla. Removal first involved a single Phillips screw, which is visible behind the handle. Then is a simple matter of pushing the assembly...
forward to release the plastic anchor point located on the back of the assembly. Finally, the handle will be positioned to push through the opening so the panel can be removed.

The photos in the 1-2-3 sequence below indicate a release handle that is fixed in place as part the mechanisms behind the door panel in a 2002 GMC Yukon. Removal simply involves a trim panel covering the opening that the release handle comes through. This opening that remains is large enough to remove the panel without having to remove the door release latch itself.

In some cases, the door latch release assembly is not meant to be taken out of the panel, nor is there a removable surrounding trim. These applications require that the door latch release connecting rods (and door lock motor rods) be removed from the handle assembly once the panel has been pulled away from the door sheet metal. 1996 and newer Jeep Grand Cherokee is such an example.

Like all panel and interior trim disassembly tasks, the installer must take a good look at the area to determine how it is to be removed. It is especially helpful to access the Scosche Autosound Encyclopedia resource to help with vehicles the installer has not experienced yet. In addition, help from a more experienced colleague in the bay will also minimize the frustration of first time door panel removal headaches.

Armrests

Some vehicles have a strategically placed armrest that allows use of several anchoring screws to secure the panel to the door. In addition, because the armrest frequently has a high degree of abuse (by being “pulled” all of the time), the armrest must have a solid attachment to the door that won’t fail over a long period of time. Though the method of achieving this result differs from vehicle to vehicle, many manufacturers hide large thread screws in the base of the armrest pad. Some are accessible by removing a few plastic screw covers (using a Pick Tool), while others have clearly accessible (open) holes. Occasionally, an installer may find the top portion of the armrest removable for access to the mounting screws. Whatever the armrest application, the vast majority of door panels utilize the armrest as a key anchor point between the door panel and the door itself. Keeping this fact in mind will help an installer investigate the door panel removal process with greater skill and precision.
The photos in the 1-2-3 sequence above indicate an armrest in a 2000 Toyota Corolla. Removal first involved popping up the pressure fit clips on the top portion of the armrest. This exposed the two large thread Phillips screws that provided the anchor to the door itself. Once the two screws are removed, the armrest portion is no longer held to the door. This same two screw attachment is very common, whether accessed from the top as in the Toyota application shown, or from the under side as in many other applications.

Some vehicles use a single vertically threaded screw in a recessed area of the armrest (where the drivers fingers would go when pulling the door shut). In these cases, a single screw is attached vertically to a bracket that extends from the door sheet metal allowing the armrest to sit atop the bracket. Always remember, all panel and interior trim disassembly tasks require a good look at the area to determine how it is to be removed. A few minutes of careful analysis and investigation with a Pick Tool or Panel Removal Tool should make the task easy.

Push Clips/Threaded Clips

Cosmetically, a plastic clip typically blends much better than a metal screw. In cases where a very small degree of panel attachment strength is required, plastic “Push Clips” or “Threaded Clips” offer a cosmetically pleasing way to use a front mounted attachment without much difficulty in removal.

Removal of the Push Clip style is simply a case of pressing down on the center of the clip and then moving in around the base of the clip with a traditional Panel Removal tool. Push Clips are found on all types of panels, including door panels, kick panels, and on interior trim that is not load bearing. Push Clips don’t have much inherent strength. They are identified as Push Clips (rather than the Threaded Clip type) because there is no place in the middle pin in which a Phillips or straight blade screwdriver can be inserted.

Removal of the Threaded Clip is not much more difficult. It’s first useful to have the Panel Removal Tool under the collar of the clip and then gently back out the center pin with the appropriate tool (generally a small Phillips screwdriver). The Threaded Clip is also used in locations that are not intended to be load bearing such as door, trunk, and kick panels. An example of a Threaded Clip is pictured.

Switch Banks and Switch Panels

Nearly all door panels contain some electrical function. As vehicles have progressed, creature comforts like power operated windows, locks, and mirrors have become very commonplace, even on entry level vehicles. Many of these door panel mounted switches have a common mounting configuration known as a switch bank. A switch bank can easily house switches for four or five different functions. Though these are individual switches and circuits, the switch bank often has a single electrical connector that makes assembly and removal of the door panel much easier.
Individual switches are also a frequent obstacle for panel removal, whether it is a door panel, dash panel, or a console application in which the switch is located. Many switches must be removed to allow access to critical mounting hardware for a particular application, while there are others that are part of the panel, which is intended to be removed. In either case, a certain degree of electrical wiring “slack” must be available to allow removal of the switch or entire panel prior to disconnecting the electrical plug located at the back of the switch.

The majority of switch panels and switch banks can be removed gently with a panel removal tool or with pick tools. Applications in a door panel may be suitable for use of a panel removal tool, though some complex door panel construction may not allow a large enough seam for a panel removal tool to carefully remove the switch panel or switch bank. Switches (or switch blanks which fill spaces for factory switches that are unused) that are located in a dash or console area are best left to the pick tools for removal. An installer should never use small flat blade screwdrivers for switch panel removal with exception of a “jewelers” type screwdriver that has a razor thin tip. Any screwdriver with any amount of thickness will almost definitely leave a trail showing where the installer attempted to remove the panel. This is why using screwdrivers is strongly discouraged.

Dash “Fascia” Panels and Trim

Various dashboard applications involve a fascia or trim panel surrounding the headunit and HVAC controls. These trim panels will either have a mounting screw type attachment, or more likely, will be held in place by a series of strategically placed clips. Though all dash fascia panels and trim are not held in only by pressure fit clips, the small and brittle nature of the panels makes them risky to place mounting screws into. When vehicles drive down the road, they vibrate and shift which can cause a relatively light and brittle panel to crack around a screw opening if a screw has been applied too tight. Pressure fit clips eliminate this problem by relieving the frontal pressure on the panel. The openings that the clips fit into are usually large enough to allow some minor movement with normal vehicle operation, yet sized correctly to offer a tight fit without the need for additional hardware.
These pressure fit clips must be removed gently with a series of investigative probes with small tools such as the pick tools. The pick tools give the most leverage when inserted into seams between the panel and adjacent surface but typically leave little or no trace of the installer having been there. The idea is to see if applying a little outward pressure will release the clip holding the dash panel. When this is successful, the process is simply repeated slowly around the perimeter of the panel until it is successfully removed.

The ashtray panel in this Lexus LS 400 is held in firmly by four pressure fit clips. After the ashtray is removed, two mounting screws are accessible. A similar process with the A/C vents atop the headunit is required for removal of two additional screws.

In many cases, the dash or console fascia trim is simply a cosmetically designed cover for mounting screws of the component the installer wishes to remove, such as a headunit. Removal of the dash or console fascia panels is often necessary to gain access to the mounting hardware that secures the electronic components into the dash or console. Once again, consider how the vehicle was assembled to make the easiest investigation of how it comes apart.

The dash trim panel in this 2002 GMC Yukon is relatively simple to remove. It is simply held in place around the perimeter by pressure fit clips as demonstrated in Step 2. Removal is easily accomplished by slowly releasing one clip at a time until the panel is free from the dash. In many cases, the shift lever will need to be taken out of “PARK” and put into the lowest gear position while the vehicle is NOT RUNNING so that the panel can be pulled free of the dash. Most GM/Chevrolet Trucks as well as Ford and Dodge trucks from 1992 and on use this style of dash panel attachment.
Door Sill Panels/Kick Panels

Another common area where panels need to be removed to facilitate running wires throughout a vehicle are the door “sill” and kick panel areas. These areas are generally covered by simple plastic panels that have only a few screws or clips holding them in place. As these panels take a lot of daily abuse from passengers getting in and out of the vehicle, it’s essential that they are held securely in place no matter which style of panel attachment may be employed. Often times, trucks and vehicles that have heavy traffic in and out may choose to use a screw or two to securely attach a door sill panel.

The door sill panel in this GMC truck is simply held in by pressure fit clips and a small clip behind the rear seat bolt. To remove the panel, simply insert the panel removal tool (Step 2) and gently pry the panel up until the clip releases (Step 3). Follow by moving along to the next clip until the panel is free and can be completely removed.

When removing door sill panels and kick panels, a panel removal tool is generally the handiest tool to have around. If there are screws present, it’s also useful to have a Phillips screwdriver as well. It is important to remove any clips one at a time rather than tearing up the entire panel at once. The clips that are used on door sill panels and kick panels are generally not heavy-duty clips and can tolerate only a few times being removed before not fitting as tightly into the opening as they originally did. Care taken during the removal ensures accurate reassembly.

Another consideration to ensure accurate replacement of door sill panels and kick panels is that the wires run in the channels which these panels cover are not inhibiting the panel from “seating” properly in it’s original location. Bulges in (or immediately underneath) panels that have pressure fitting clips can easily cause the panels to come loose or pop out of place. This is a disappointment for the customer to experience and is totally preventable.
Under Dash Panels

Access to the “under dash” area of the vehicle will be necessary any time a security system, remote starter system, or an audio system “wiring run” for an amplifier will be installed. Most under dash panels have screws or threaded bolts to secure the panel. While there is a cosmetic purpose to the panel, many under dash panels also serve the purpose of protecting the contents of the under dash area from the knees of the driver or passenger. As such, it may be necessary to remove several screws or bolts to gain access to the under dash area.

The driver’s side under dash area in this Lexus LS 400 (at left) is accessed by a combination of pressure fitting clips and several threaded bolts with 10mm heads. In Asian vehicles, the 10mm hex bolt is very common for critical under dash components. When disassembling Asian vehicles, it is handy to have a Phillips head screwdriver, 10mm and 8mm sockets, and panel removal tools.

It may also be a common issue to remove ducting on the driver’s side for the HVAC system to gain access to the under dash wiring and components. Depending on the vehicle, some may need to remove a vent extension that connects the “middle” of the dash to the venting system on the “end” of the dash or that connects into the door. Since this is a routine service operation that even mechanics would need to perform, the vent is usually removed with a minimum of clips (if any at all) holding it in place.

The passenger’s side under dash area in the same Lexus LS 400 pictured (right) contains several electronic control modules. Pictured are the ECU (Engine Control Unit) and the ABS (Anti-Lock Brake System) modules. It is always advised to keep high current power and ground wiring away from these sensitive components. While these modules are found more often (and in higher quantities) in “Premium” vehicles, every vehicle made in the past 10 years probably has at least one!

Keep in mind that if HVAC vents or vehicle electronic control modules are present, wiring and component modules (such as remote starters and security systems) should be installed in such a way as not to interfere with the reassembly of these components once the dash areas are put back together. Any high current power and ground wiring (such as the wires that run from the battery to amplifiers) should be kept away from any electronic control modules rather than attempting to move or relocate the module. Relocating an electronic control module may inhibit the function of the module and is NEVER recommended.
Most installations for security systems and remote starters will require access to the key switch area of the dash. In the majority of these installations, one or more of the under dash panels will need to be removed and (depending on the location of the key switch) the bezel surrounding the switch may need to be removed as well. Once again, be certain that any connections made in these areas are both secure and out of harm’s way.

Access to the under dash area of the vehicle is a task that an installer should not take lightly. It is very important to reassemble and arrange all components and panels in their original order, especially where the vehicle mechanic is concerned. Tape, split loom, or otherwise camouflage any aftermarket wiring and connections. Securely mount any control units, relay packs, and sensors. Most importantly, never install anything in a way that will simply fall out when the panel(s) come back apart. If any concerns over a vehicle’s “mysterious” electronic problem(s) arise, most car dealers will quickly blame the cause of the problem on the installer or the install shop. Having a neat and tidy under dash area (and correctly reassembled) keeps the finger pointing to a minimum and reduces unnecessary claims for damage.

Glove Boxes

It may be necessary to remove a glove box so that a security system control module can be well hidden from a potential thief. Doing so takes only a little extra time and makes for a neat and tidy location for a control module where space permits. Not every glove box will have room behind it, nor will every glove box area come apart the same way. Perhaps the best approach is to, once again, consider how the glove box area was assembled. Once this has been investigated, determining how it can be removed is much easier.

If removing the glove box, take care not to use the glove box door as a shelf for screws, tools, or other hardware. The glove box door support is generally integral with the whole assembly and may be damaged if it bears excessive weight while a portion of the glove box is removed.