

Note: All Collector Edition Corvettes have Crossfire fuel injection. For information on maintaining and modifying this unique injection system, look here:

<http://www.thecubestudio.com/CrossfireTechSeriesIndex.htm>

1982 Corvette Collector Edition **Simpson Hatch Hinge Installation Instructions**

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Revision 11- 12-23-08 Added instruction on dealing with stuck attachment parts with links to newly available replacement buttons and washers.

Revision 12 12-24-08 Wordsmithing for clarity, fix typos, cull outdated stuff, moved some photos, general shuffling to better accommodate PDF version. Added link to replacement weather strip vendor. Added some Restoration tips.

Great appreciation goes to those who reported their install experience, including any problems and tips & tricks that can now be incorporated and passed on to the next group of buyers.

Note the silver set of hinges in some of the photos are the very first prototype which I made for my wife's CE over three years ago. Your new hinges will look different but still fit and work the same. The replacement hinges are sleeker and usually satin black in color as you will see in a photo showing punch marks and comparing your new hinges to the originals. The hinges are finished by hand so there are slight variations from one set to the next and some sets are slimmer by special request and some are very heavy for cars that are used for racing (eek!).*

**NOTE: Hinges are now cut on a CNC machine, but still finished by hand.*

I have now made about 100 sets of hinges over a period of three years. To my knowledge, one set has been powder coated for a custom show car, one set has been painted silver-beige body color, my wife's original prototypes are brushed and the rest are satin black. None have been polished, chrome plated, or blasted for a matte satin finish. If anyone has done something interesting with the finish, please let me know.

First, some background on the hatch glass problem:

The opening hatch for a C3 Corvette was first offered by a third party as a kit. GM bought the kits and installed them on production Collector Edition Corvettes as a way to make them unique (and to sell more of the cars).



So, it is significant to consider that GM's engineers did not design the hinges. The original hinges are sand castings made from very weak and inexpensive material . . . most likely a zinc alloy.

The latches on the rear of the glass are slotted and therefore are not intended, and are in fact incapable of fixing the glass position in the forward/backward direction. The gas springs ('struts') impart a steady pressure rearward when the glass is closed and that force must be resisted by the hinges. Acceleration adds to the stress placed on the hinges. They are not strong enough and are made of a

material that 'creeps', so, as we all know, over time (in some cases only a few months!) the hinges slowly bend and allow the glass to move rearward until the latch pins reach the end of the latch slots, which then jams the hatch closed.

So there you have it. Other than disconnecting the gas springs, there is no way to stop a Collector Edition hatch from creeping rearward and eventually jamming. Unfortunately, many of the cars have had both the hinge mounting brackets and also the latch pins mangled in an attempt to get more adjustment or to free the latches. People have removed the hinges and squeezed them back in a vice to what they thought were the original dimensions. It is very unfortunate that some owners have bought used original hinges from less-than-ethical sellers for about \$200 and for as much as \$500 for a set described as 'unsprung' hinges from a 'super low mileage' car or even hinges claimed to be 'new'. All in vain . . . the hinges will stretch and stretch again no matter what you do to them, or how new or old they are. It is just a bad design.

Your new Simpson hinges are a permanent solution. These instructions will step you through not only installing your new hinges, but also adjusting the glass and latches for a good seal and a perfect operating hatch. Once you complete the task, you will never have to do it again. Your new hinges will not stretch . . . ever.

INSTALLATION

To get started, you will need only a couple of small open end wrenches, a Philips screwdriver, a helper and a lot of patience. I supply a new allen wrench, pivot end centering washers, optional new glass attachment hardware (buttons and washers), a new bolt for the glass end of the hinge, and usually also a few extra shims (depending on availability), and PDF version of these instructions that can be printed with the photos for you to refer to during the install. .

If you need a new weather strip for your CE, I have gotten good reports from hinge buyers on this replacement. If you buy one, please give me feedback on it.

<http://www.corvette-rubber.com/6882windshield-hatch.shtml>

I recommend you avoid Eckler's as I have gotten bad reports on that piece.

You may also want the paint that comes on your hinges in order to fix up other parts as you go thru the install. Restoration tips are sprinkled thru the instructions. It is expensive and normally only available at body shop supply stores, but I find it here for a very good price:

<http://www.sjdiscounttools.com/sem39143.html>

(if you find any links broken, please let me know.)

As of November 2008, after many, many requests, **new replacement buttons and the black machined washers that they sit in are finally available** on a limited basis exclusively to my hinge owners.



OK, let's start taking stuff apart!

1) First step is to get the interior panels off. Remove these screws. This can be done with the glass closed if needed.



TROUBLE TIP: If your glass is jammed shut, then you can remove the struts from the car body end with the hatch closed. The strut end is a ball and socket. Study the following pictures. The ball is attached to the car and the socket is on the strut. The socket can be easily popped off the ball AFTER you remove the nearly invisible retainer clip. It simply rotates and then pulls out, allowing the socket to then pop off the ball. There is probably some pressure from the spring, so you may have to grab the tube and push it toward the back of the car while you pop it off the ball mount. Hang on to the tube and let it slowly extend. There is not a lot of pressure and the strut is hydraulically damped, so getting it off is not as scary as it might seem.



2) Remove the gas struts.

You will have one of these type of connectors on the strut . . . the top is original or a correct replacement.



Detail of the retainer clips:

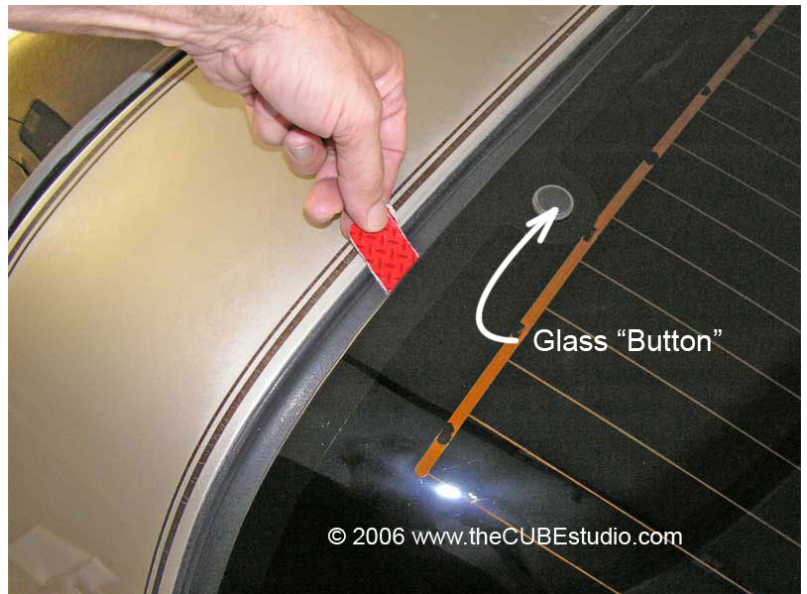


Once you have the struts free, proceed with the next step.

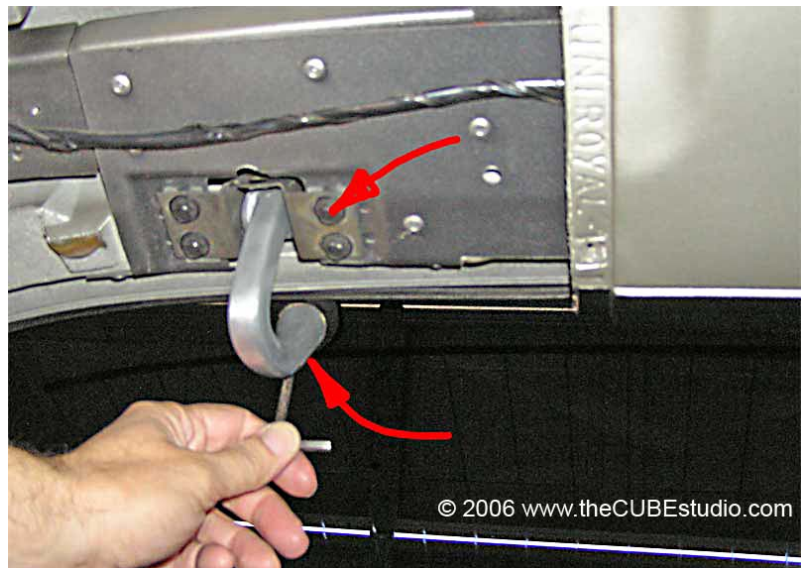
3) Pull seat belt all the way out of retractor to allow you to put the panels aside. You can hold the belt with a clip or small vice grip:



4) With the hatch closed, remove the old hinges from the car . . . note that I will refer to this part (shown in the next picture) as the 'glass button'. It is made of steel and has a smaller diameter 'barrel' that reaches thru the glass and into the hinge. It has two plastic washers; one that you see under the button (this one reaches thru the glass), and one plain flat washer on the under side that goes between the hinge face and the glass surface:



Use the supplied allen wrench (as shown in the next photo) to remove the bolt (socket head cap screw) from the glass end of the hinge then remove the 4 screws that hold the mount to the car. Keep the shims and the bracket mounting bolts. A new bolt is supplied for the glass end of the hinge.



TROUBLE TIP: If you cannot remove the glass mount bolt. There are little flats on each side of the metal glass button that are intended to prevent it from spinning in the hinges so that the bolt can be tightened. If the steel bolt has corroded into the steel button, then the button may rotate in the hinge pocket anyway. If the button turns when you try to remove the bolt, and you intend to re-use the original button, then do not hold the button from the outside of the car with a vice grip or similar tool. Take a 5/16" drill bit and drill into the head of the allen bolt that is up inside the hinge. Just straight into the hex socket. That part of the bolt is soft and can be easily drilled out. You are only trying to drill off the HEAD of the bolt. You should only have to drill about 1/4" deep or so to get the head off the bolt. Then you can pull the hinge off and push the button (with the bolt shaft still in it) out of the glass. Put penetrating oil on the bolt threads and work on getting the bolt shaft out of the button by gripping the barrel of the button (it does not show) and not the head.

TROUBLE TIP: If the button is still stuck tight in the hinge. Sometimes even after getting the bolt out, or drilling the head off, the button is still be stuck fast.

Why is it stuck? In addition to the problem of rusting, I have noted that the barrel diameter of the stock buttons varies quite a bit, so they can be loose or snug or even stuck in the original as well as the replacement hinges. Therefore, the following tips apply to both original and replacement buttons . . and also to original or replacement hinges . . or any combination thereof.

Note that hinge buttons and washers are shipped in the ends of the hinges with the bolt threaded loosely into it. The bolt head is up in a hole where you can't see it readily so I thought it would be a good idea to mention that it's in there. Remove the bolt before you try to pull the button off the end of the hinge, and keep these buttons separated from the rear buttons as they are different.

The snugness comes from the sharp edge between the flat and the barrel. The corresponding corner in the pocket is rounded because of the round cutting tool that makes the pocket.



Knocking that sharp edge off should cure the snug. But the bolt will pull it in no problem without modification, as was done in the example shown in the above photo.

*Note: Replacement hinges shipped after 11/01/08 have revised pockets that eliminate the snugness issue.

If you pry the button by its 'hat' it will probably bend the hat edge, so if you do get a button stuck, or find the original button stuck, I would suggest the following procedure:

Remove the bolt, then thread it back in one or two threads only. Now tap on the end of the allen wrench to get the button out. Hold on to the allen wrench or it may bounce out

and scratch something. I supply a new long-arm allen wrench with each hinge set. If you have drilled the head off in a previous step, you can still use the allen wrench or any sort of long pin punch to accomplish the same thing.

The above technique works to get the original stuck buttons out during disassembly, but be very careful if you are tapping on the allen wrench (or pin punch) to get a button loose while the hinge is still installed as the glass is taking the shock of the tapping.

If it requires more than a light tap, I would suggest getting a tube of some sort that the 3/4" diameter button head will just slip into and place it over the button. It must rest on the washer and NOT the button head or the glass. Possible examples are some 12point 19mm or 3/4" sockets. Perhaps a pipe nipple or copper tube fitting. Whatever you use, make SURE that the button head can slip into it, and that it is not resting on the glass. Then have a helper hold something hard and heavy (like a hammer head) on the socket. The arrangement is illustrated here:

NOTE: the hammer is not used to hit the socket.

It is a stationary backup to absorb shock of tapping from the underside to free a stuck button on an installed hinge.

The purpose is to have some mass to absorb the shock rather than the glass itself taking the hits. The glass is tempered and is very tough, but there's no sense tempting fate.

If you use this technique, make sure you or your helper carefully watches the tube or socket to make sure it does not touch the glass at any time. If you have any concern at all that the tube may slip off the washer, or that the washer may slip up into the tube allowing the tube to then touch the glass, then cover the glass up to the washer with several layer of duck tape as a precaution.

In the very unlikely extreme case where the button refuses to budge, do not just 'ramp' up the strike force without limit. **Better to drill the head off from the outside and get a new button (now that they are available) than to shatter the glass.** You should contact me with any problem before using excessive force in any procedure during the installation of hinges and adjustment of the hatch.



RESTORATION TIP: The glass buttons are just mild steel and can be cleaned, sanded and painted like any other steel part. I recommend SEM trim black for the final coat. That is what your hinges are painted with. It also does wonders for the windshield trim and the black around the T-tops . . see additional restoration tips at the end of these instructions! It is the only product I have ever found that actually sticks to aluminum with no adhesion promoter. Use regular primer on the steel button for corrosion protection.

5) Now for the glass adjustment. Typically, the glass has moved way back on the car. You may have daylight between the glass and the front of the seal and typically the rear edge of the glass is very close to the fiberglass body. When you are finished with this step, your glass should be sealed and there should be about a 1/4" or better of weather strip showing at the rear edge of the glass.

With the struts and hinges off, the hatch is no longer jammed and can be pushed forward by just slapping your flat hands on the glass and giving a shove from the back of the car. Unless the latches have been badly misadjusted, you should be able to move the glass without opening the latches. Take your time here and get the glass to fit as well as possible all the way around the seal.

Note: unless you reposition the glass to its original position, it can be difficult to get the new hinges on as they are built to the correct dimensions of a new hinge and may not reach the glass if it is far back from where it should be.

TROUBLE TIP: If you cannot reposition your glass. The glass makes indentations in the weather strip and may be caught in them. Have a helper gently push the front of the glass up off the weather strip from inside the car while you push the glass forward. It is also possible that the latches are misadjusted to the point where the glass will not move forward enough. The latch adjustment also centers the glass in the back. If the glass refuses to move or it is off center, you'll need to get the latches off before you can get the glass to settle in nicely. If this is the case, then go into the car and unscrew the latch pins from their mounts (chrome parts under the glass). The pins have flats on the side and are turned with a small open end wrench. Once the pins are off, you can proceed to position the glass. As an alternative, you can unscrew the balls (which are actually bolts) from the glass buttons and remove the entire strut mount from the glass. This is what the parts look like:



6) Install the new hinge in the mounting bracket in the same orientation as the old hinge. Use the washer provided to center the hinge pivot in the bracket:

CAUTION: your new hinges may look identical but they are left and right and cannot be interchanged. There are two center punch marks near the pivot of each hinge. These marks face the OUTSIDE of the car*.



Note that if you received your hinges prior to November of 2007, the punch marks face the inside. To make the punch marks easier to see during installation, I began placing the punch marks facing toward the OUTSIDE of the car after that.

7) Before you do this next step, test fit the glass buttons into the new hinge faces. The button should go down into the hinge face once the flats are aligned and should not rotate. If the buttons are too snug to push into the hinge, see the 'stuck button' Trouble Tip a few pages back.

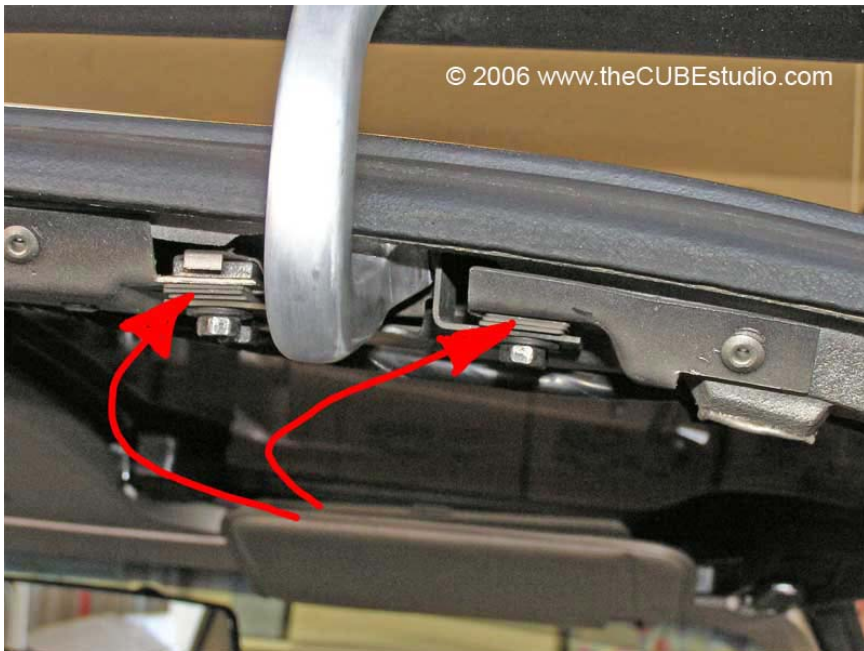
Slide the hinge mounting brackets fully up into place (it may take some wiggling because the pivot bolt may just barely clear the opening) and then put the washers in place and get the glass button snugged into the hinge face and make very sure that the flats on the sides of the glass button go down into the pocket in the face of the new hinge before you snug up the new bolt. You will likely need a helper for this.

CAUTION: Do not over tighten the glass bolt. Do NOT bolt up the mounting bracket first, then the glass bolt second. Your new hinges have ZERO flex and the glass bolt is fine thread and can exert a lot of force. If something is out of alignment and you crank down hard on the bolt, . . . well it hasn't happened yet, but it could get ugly. The glass bolt need only be snug . . maybe as tight as you can make it by hand turning the short side of the allen wrench.

Shims go between the mounting bracket and the car body, but the following pictures help to show the location and orientation of the shims. The brackets are also adjustable side to side. You may want to test fit the appropriate interior piece at this point and line the hinge up with the slot.



I have observed a lot of variation from hinge to hinge (the originals), one glass to the next and especially from one body to the next in C3 corvettes. I believe there is also 'replacement' glass and I know there is 'replacement' weather strip. This adds up to a lot of variation from car to car. There is a lot of adjustment available in the hinge mount so you should be OK. At this point the hinge mounting bracket should be fairly well aligned with the car body mount. It should be parallel and need a few shims like this picture shows. If not, something is wrong so please STOP and contact me.



The shims adjust how hard the glass is pulled down onto the weather strip. Get all 4 bolts started loosely and just slide in enough shims to fill the gap between the bracket and the car body mount. Snug the bolts for now.

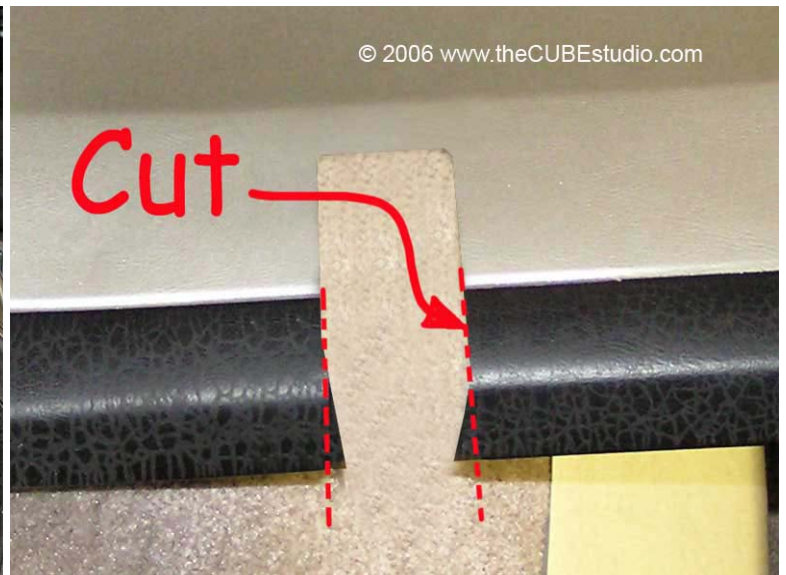
The shims adjust how hard the glass is pulled down onto the weather strip. Get all 4 bolts started loosely and just slide in enough shims to fill the gap between the bracket and the car body mount. Snug the bolts for now.

8) Install the shims and tighten the hinge bracket bolts . . . and test the seal by inserting a slip of paper between the weather strip and the glass as shown. There should be a slight drag on the paper: If you don't have a good seal, add another thin shim and retest. Remember that the shims control how tight the glass is against the weather strip vertically, but moving the glass forward and back also has the effect of tightening and loosening the seal, so get the glass where you want it and THEN adjust with shims for a snug seal against the weather strip.

9) Once you get everything adjusted and sealed, tighten the hinge mounting bracket for the last time.



RESTORATION TIP: You may find that the factory has done a crappy job of cutting out the slots in the panels which will have the hinges rubbing when the glass is open. Carefully remove the rubber trim piece and cut the slot straight as shown:



10) Open the glass and install the struts. The tube end goes UP (toward the back of the car when the hatch is closed).

RESTORATION TIP: it is important that the pressure be the same in each strut. These are actually called 'gas springs' and they typically loose pressure slowly over time. Obviously if the struts loose too much pressure they will be unable to open the hatch fully, but less obvious is that the DIFFERENCE in pressure for one to

the other will rack the glass and prevent the latches from working smoothly and the glass from closing properly. Fortunately, this is easy to check. Simply hold the strut vertically tube end up. Put the shaft end on a bathroom scale and compress the strut by pushing down on the tube end. The bathroom scale will show the pressure. It is important is that the pressure is the same on each side. If it is not, you will not get the hatch to operate properly. 'Reproduction' CE struts are sporadically available from a couple of sources. If you are into NCRS, then you can get the original struts resealed and recharged by an outfit in Canada. Last I knew the cost for that was \$90 per struts. There is more info at the end of these instructions.

Turning now to the latches: Take a look at this photo:



The other side has a similar latch, but both cable adjustments are on the left side hatch shown. The cable adjuster (on the right in the photo) is for the pull handle, and the other one is between the latches and is used to adjust the latches to open at the same point.

The latches have all manner of adjustment and will make you crazy if you let them. After doing several cars, I have found what works best for me is to slowly close the hatch while observing where the latch pin aligns with the latch.

11) With the latch attaching bolts just snug enough that the latch can be tapped around, tap it around until the latch pin comes down exactly in the center of the latch, both forward and back and side to side if possible. The latch only grabs one side of the head on the latch pin, and has the effect of pushing it to one side on closure, but the latch will not release smoothly unless the pin comes down centered, so ignore the catch in the bottom of the latch and adjust for the pin to come down nicely right in the center of the latch.

12) The latch pin is threaded and serves the same purpose on the back as the shims on the front; tightness against the weather strip. It adjusts by turning it with an open end wrench using flats on the sides. I like to set this adjustment so that when the hatch is closed you can still push the glass a bit further down by pressing firmly on the glass at the latch. This provides a perfect seal and is not so tight that the latch will not pop open easily and smoothly. Whether tight or loose, what is most important is that the setting is the same on each side.



RESTORATION TIP: Unfortunately, I have seen some of these latch pins with half of the head ground away in an effort to free a stuck hatch. If you have this situation, you will be limited in adjustment to the orientation where the remaining head can be caught by the latch. If your weather strip is still fairly supple, you might be OK. If not, you might try swapping the pins side for side to see if you can get a different adjustment that way. Failing that, the head can be welded up and then filed or machined back to the original contour. Any machine shop can also easily make new pins for you, although it is likely to be pretty expensive. I have no plans to produce these pins.

13) And now for the final adjustment: Using the threaded ends on the pull cables, adjust so that each latch releases at the exact same moment. If you pull the release handle very slowly, likely one side will pop open before the other. Adjust a little and repeat. It's a bit tedious, but the results are very satisfying and with your new hinges, the setting should hold for a long time.

RESTORATION TIP: This is a good time to fix or reinforce pulled thru screws:

14) Reinstall all of the interior pieces in reverse order.

15) Enjoy using your hatch! My wife hauls a laptop and briefcase back and forth to work in the back of her CE every workday so the hatch gets used at LEAST twice a day (more on weekends) and has never been readjusted since the first set of hinges was installed over three years ago. It still works perfectly. You can expect similar results.



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Please feel free to report errors or suggest additions. steve@thecubestudio.com

Cost for the hinge set is \$330 including insured shipping.

Replacement attachment buttons, including new washers are \$10 each.

NEW REPRODUCTION STRUTS AVAILABLE NOW.

Note: After many requests and people being on wait lists for a long time, I am making new reproduction struts available on a limited basis:



Here are photos of the actual reproduction strut I am making now (top is new reproduction strut, bottom is original). The new struts have correct dimensions, correct chrome shaft, correct black metal ends, correct size black body, correct extension distance, pressure and damping.

In other words, they fit perfectly, operate correctly and look exactly like original struts with the exception that there will be no blue printing identifying the manufacturer as on the original, and there is a slight ring where the extensions mates to the bottom of the strut, as you can see

if you look closely at the photos. The ring is in the strut and not my extension. Also the paint on the new strut is much smoother than the original.

The struts come with new ends and new safety clips. You do not need to re-use any part of the old struts, so even if you have incorrect plastic ended struts (Eckler's previous 'repro' struts) or no struts at all, you're covered.

26 sets were made. There are 2 sets still available as of 12/23/08. When these are gone, I will start a waiting list as with the hinge sets. There is no guarantee of future production.

The cost is \$120 plus \$15 shipping for hinge buyers. Struts are shipped separately in a new super heavy duty tube to protect them from damage in shipping.

Delivery started in mid April 2008

By contrast, Eckler's repro struts are now \$220.

http://www.ecklers.com/product.asp?pf_id=35564&dept_id=1502

They have incorrect ends, the reduced diameter 'stud' at the end of the tube is incorrect and they do not have the original blue printing.

Contact steve@thecubestudio.com for any additional information.

PAINT TOUCH UP AND TRIM RESTORATION TIPS

The paint on your hinges is SEM trim black. It is made specifically to go over bare aluminum without having to use an adhesion promoter first. Note that this paint gets harder and tougher with time, but is somewhat delicate for as long as a few weeks.

Adhesion promoter (I have used Bulldog) is a self etching clear paint that sticks to aluminum and other problem materials and give the topcoat something to grip.

The SEM is pretty rugged stuff being made to go on aluminum trim outside the car, and I used nothing over it on the hinges, so touch up is easy and should blend well. It does an awesome job on the trim around the windshield, and also the rubber edge around the T-Tops. I did my wife's daily driver CE two years ago and it looks like I just did it!

I'm not sure if the debate over brown vs. black for the rocker covers (on the body, not the engine) was ever resolved, but if you want satin black, the SEM trim black will do that job also.

This paint is expensive and usually only available at auto body supply companies. However, I recently found it on-line . . . and almost \$5 cheaper to boot!

<http://www.sjdiscounttools.com/sem39143.html>

Satin paints usually touch up well. Just crinkle up some tin foil, close spray a nook or cranny with the black and then use a small hobby brush to dip into the little paint pool you made and fill in scratches. If you have gotten wax on the hinges, you will have to clean them first with a prep product.

Note that lacquer thinner strips off the SEM trim black. Do NOT get lacquer thinner anywhere near your car's paint., The fumes alone can lift nearby paint.

To do your windshield trim, obviously wash the car and make sure it is completely dry. If you have compressed air, blow over the trim to get as much water and dust out from under it as you can. Any drop of water hiding in a crack will jump out just as the spray paint nozzle passes over.

Then clean the trim with a prep product. I use PPG 'wax and grease remover', but DuPont 'Prep Sol' is also good. These are strong solvents but are completely safe to use on your car's finish. In fact they work about 100 times better than 'road tar' or 'bug' or 'goo' removers you get at the auto store. Just remember they remove the wax also, so re-wax any areas you clean with this stuff.

You must use these products in a specific manner or they will NOT work and in fact will make things worse. To use these products you get the surface very wet and keep it wet continuously for a minute or two . . no rubbing . . and then wipe with a clean rag (I use paper shop towels) while the surface is still wet. Do not use the same area on the wipe rag twice! The solvent dissolves and suspends the silicone and other contaminants. Wetting one rag and wiping it around only moves the contaminants from place to place and may actually drive them further into the surface.

Do not skip the prep step as you surely have silicon on the trim from waxing the car and it will ruin your new trim restoration. Also do not sand before using the prep or you will grind the silicon into the remaining paint and aluminum surface making it extremely difficult to get out.

Tape off the area and then scuff the surface with 400 grit paper . . no finer than that . . and feather the edges of any chips. Do not wash the area again, and do not touch the surface with your bare skin . . which includes finger tips. If you do, clean it again with the prep product, being careful not to get big drips into cracks where they can hide and jump out later. This stuff is pretty volatile so if you wait 1/2 hour, it's a safe bet even a big drip is evaporated. Be careful anyway. Blow with air if you have it and then use a tac rag to remove the last bits of sanding dust and other 'fuzzies' and you are ready to rock.

The SEM trim black is a little weird to use but the finish is dead smooth and even . . pretty amazing stuff. Spray light coats until it is ALMOST smooth. If you don't spray enough it won't flow out smooth, but if you spray till it is smooth, it will likely run. It's not very forgiving in that sense. I won't mention how many hinges I had to strip and repaint . . :-) It's worth the effort though because this stuff actually sticks to bare aluminum and no other top coat I have ever used will do that. Adhesion promoter solves the adhesion problem, but it is very, very difficult to get a smooth top coat over that stuff.

HATCH RELEASE CABLE REPAIR

Here is a link to the article that covers fixing some common problems with the hatch release cable.

<http://www.thecubestudio.com/CrossfireTechFixingCollectorEditionHatchCable.htm>