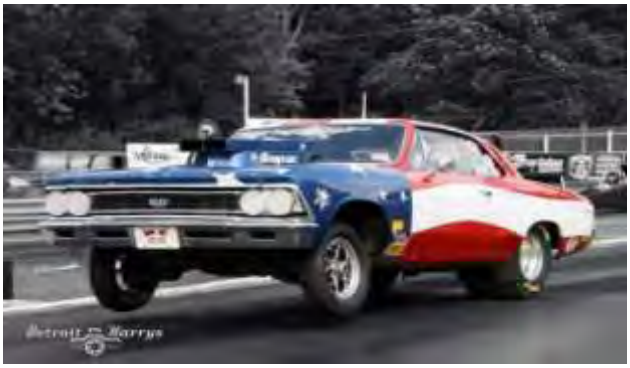
July 2016

NORTHSTAR CHEVELLE CLUB

MINNESOTA'S '64 - '87 CHEVELLE and EL CAMINO CLUB ™



Here we are, July already. Where did the time go? The year is half over. A better question:

What have you done this year??

I'm not trying to be nosy. I'm not even asking about all the car shows, cruises, and club things we have done. I'm just curious because as life goes on, I seem to get busier and busier and haven't taken the time to check in with the club or even make too many of the club events. We all get busy, and often find that even something as simple as being part of a car club gets pushed to the back burner and becomes more of an afterthought. Don't forget about us, though. Being part of a club is more than tossing $24 on a table every January. How well do you really know some of the members? I'm guilty as anyone when it comes to forgetting names, though I can recognize a face of our club members pretty easily. When was the last meeting you attended? Did you talk to more than the one or two guys you normally talk to? We have a great group here, with lots of talent and more often than not, a willingness to help. There are a couple of our members I have known for 30 years. I first joined Northstar over 10 years ago, and we still have several of our original, founding members active in the club. Many good friendships have been formed because of this club, and as long as we can continue to keep it alive, many more will happen too. It's all up to you. Oh yeah, buy a club shirt or hat too, that way we can find you.

I would like to ask this of our members: For the remainder of the year, challenge yourself to meet one other member and get to know them better. Try to meet up at a cruise night maybe. If you're both there, go wander through the cars. The conversation will likely flow away from cars, and next thing you know…. real conversation! I know some will say that they already know most members, but I bet it would be tough for many to even produce a last name or occupation. It's amazing how many people you end up seeing at a show once you know them.

Tech: Rear Disc brake swap

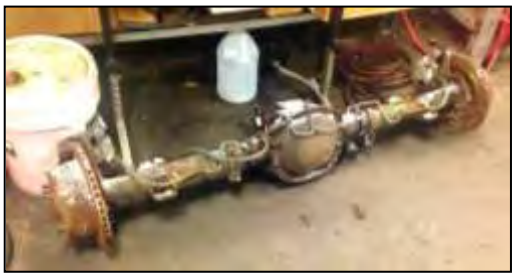
As many of you may remember, I actually have a Chevelle. Nobody has seen it in person since 2014 due to factors like: wanting to stop like a modern car since I never really trusted it in an emergency situation. Unfortunately, that costs money, and being that "my money" is not part of the "our money" account, it took a while to get the funds together to make it happen. The other contributor is: I now have 2 high school athletes: My 9th grader played on both the freshman and sophomore basketball teams (plus AAU teams on both ends of the season). My 7th grade dancer tried gymnastics, and by mid-season made the JV team. They come first, so my car sat.

Here's a brief summary to catch everyone up: In the January 2015 newsletter, I wrote about doing a front coilover swap and swapping in better front brake calipers. In June 2015, I wrote about doing a rear coilover swap. Since then, I've completed a rear disc brake swap, but other

commitments have kept me from really driving it until recently. The following tells what I did and how it worked.

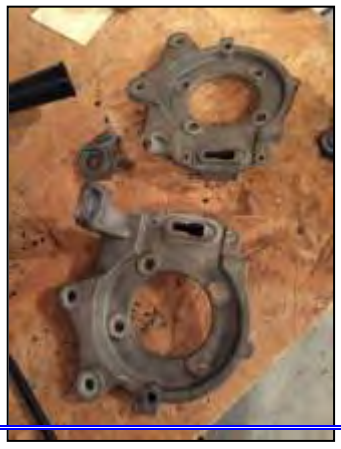
Remember the good old days when magazines like Hot Rod and Car Craft wrote stories about repurposing parts from other cars and making them work? It seems as if they now have taken the easy road (read: advertising money) by writing about swapping in a Currie rear end or ordering a brake kit from Jeg's or Summit. There's no fault in that, bills have to be paid. In fact, I think most of the time, kits are well thought out and easier since the legwork has been done for you, plus parts are clean and don't need additional repair. My swap combined both ways.

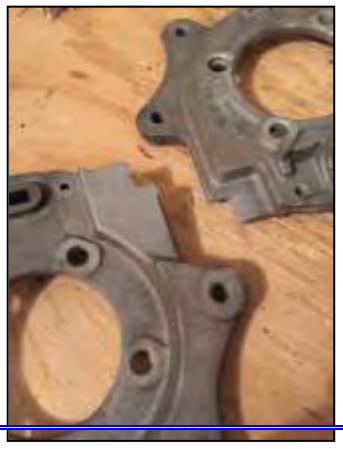
Most of the rear disc brake swaps out there use calipers from an actual OE fitment. The Cadillac ones are popular because they have an E-brake. Camaro and Corvette ones usually get you a multi-piston design and the ability to say (over your raised nose) "I have corvette parts on my car". I chose to repurpose S-10 brakes. They're simple, they will fit in a 15" wheel, and as I try to do as much as possible, I used mostly GM parts so I know where I can get replacements.



I started by doing a quick search on www.car-part.com for rear ends. A little pre-search investigating led me to find that the 98-2005 era S-10s came with rear disc brakes as an option, and the backing plate is the same axle tube bolt pattern, which would save me tons of time actually looking under cars and hoping stuff would bolt right on. My search led me to A-ABCO Fridley Auto Parts which was about a block and a half from work. On lunch break, I went over and looked at the ones they had, checking to make sure it was as complete as possible. I really only needed the calipers, brackets, and backing plates, but most rears came with rotors too. At this point, you're asking yourself "why not just buy it all new from GM?" The pieces themselves were either not available anymore or cost prohibitive compared to used. The brackets don't wear out, and I'm paying for a core either way. I picked up one from a 2000 Jimmy S-15 4x4 with 3.42 gears. Most salvage places have everything tagged with the donor's VIN, and your local dealer can decipher options if you needed info.

Once I got all my parts out, clean up and laid out, it was just a matter of sliding out my axle shafts, bolting it all on and bleeding the system, right? Nope. After several hours of trial fitting, figuring, and axle sliding in and out, I realized the spacing won't ever line up right. A call to Chris P revealed that there's a guy on eBay selling spacers that will correct my problem. Not as cheap as one would hope, but once I got them and tried again, well worth the money. Yes, I could have made them, but why bother? These were done nicely.

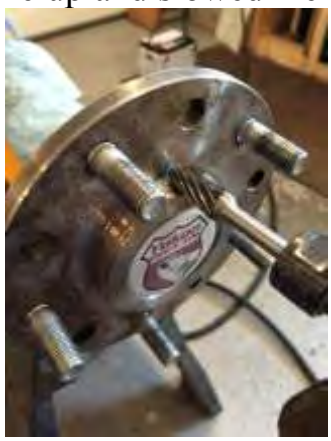




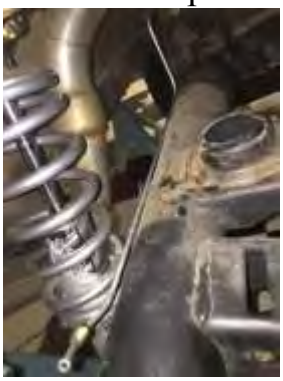
So, the spacers are in. Mounting the backing plates now became quite easy and since I'm making things up as I go, I get to choose where the calipers mount: front or rear of axle. As long as the bleeder screws are on top, it really doesn't matter. I'm not using ebrake cables, so I cut off the holding tabs. Another trip through the

blasting cabinet hid the cuts nicely and after paint they never existed.

I get some rotors to make sure they will be centered, and wouldn't you know…. the center diameter is slightly larger than the axle end it fits over. No, I didn't make the rotor fit it. I chose to relieve the area of the axle down so every rotor swap after this will go easier. We're not talking much, just relieving an edge, but it was one of those things that came up and slowed me down. Here's a tip: use a black sharpie to see the difference between what you're taking off and not. You can re-apply it as often as necessary and even lightly sand to see highs and lows. It's the same idea as a guide coat in bodywork. It's go time. The rotors are on, the axles are (back) in. The backing plates are on, the caliper brackets are on, the calipers are on. It looks great. Now I need lines.



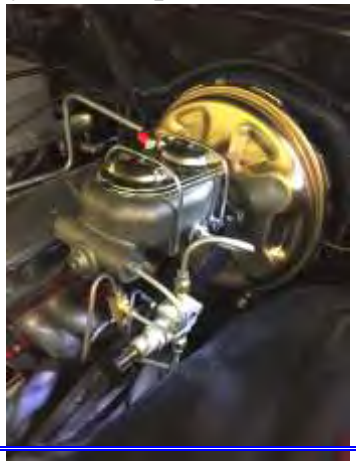
Your old lines were bent to go to the drum cylinders directly. Your new disc brakes have rubber hydraulic lines that bridge the gap between those hard lines and the calipers. Do you really need them on a rear application since everything is hard mounted into fixed positions? Yes, so the calipers can be removed. It also made it easier for when I bent the hard lines. S-10s had 2 rubber hose part numbers, but it's just a length difference. Napa provided mine.



Time for hard lines. I didn't have a bending tool, so that was on the shopping list. Next were sticks of straight tubing. I picked up 4 sticks, figuring that I needed one for each side going from the tee fitting on top of the rear end pumpkin and the first ones would be practice and most likely become garbage. I also cheated and borrowed a flaring tool from work.

Fast forward to the rear end lines being done and installed. That went pretty easy since there's only a few simple bends and the hydraulic hoses can make up a little difference in positioning. One important thing many don't realize in a rear disc swap is that you need a new master cylinder. Your old disc/drum one will not do the job. Since my original master/booster combo was off a donor car, I wanted to make sure I got the right stuff, I called Right Stuff Detailing. They hooked me up with the proper master/booster numbers for my needs and suggested adding in a Wilwood adjustable proportioning valve while I was at it. A couple days later, I got the boxes and relived Christmas like a kid. Then I realized that I needed to make all new front lines too.

My Chevelle was originally a drum/drum car. When I swapped in the front disc stuff, I ordered a proportioning valve relocating kit from Auto City Classics which provided a bracket to mount your prop valve right under the master cylinder and a couple pre-bent metal "pigtail" lines. It worked well then, but the new adjustable prop valve had differently located ports.



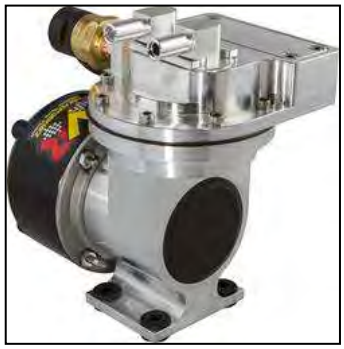
First order of business was to make a bracket to mount the new valve. Where? Some say on the frame, some say at the firewall, some have it right at the master. I chose at the master because it would be easy to access and look decent. Making the bracket was easy enough, I cut the side of a soda box out, put a couple mounting holes in it, and then trimmed it until the bracket put the valve in position. Duplicating that onto metal

was a little harder, but I got it to work out well with some grinding and a bend. I even picked up some nice hardware to mount it cleanly too.

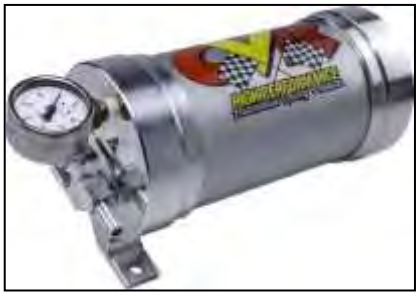
Bending the lines to go from the master to the prop valve turned out to be a challenge. One line needed to come out horizontally, turn downward, and move laterally to plug into the valve, while the other needed to join a tee that led to the front calipers. Of course, those needed a little tweaking and I had to make a new line going from the prop valve to the frame where it joined the rear brake line. Of course, that involved several feet of wasted line, but it worked in the end.

So, it's all done. I'm bleeding the system and the rears WILL NOT bleed. I'm using a MityVac hand pump, and cannot get it to work well. I ended up getting brake fluid into the pump body which wrecked the seal. I called in the high schooler and we did it old-school. Check for leaks, fix leaks, go through it all again to make sure we're good, and take it for a test drive. Brakes still sucked. Feeling peeved off, I parked it (this was now late September I believe) and went back to researching why.

You know how they always say "start at the beginning"? Well, I went back to the beginning. My MityVac tool donated its vacuum gauge and I plugged it in. That fairly small cam in my car was only producing 12 pounds of vacuum. My brakes require more, like 18 or so. Yeah, that was the problem. That has been the problem since day one… but at least I have cool looking stuff on my car now. I even went so far as to hook up the Chevelle's vacuum booster to my daily driver Impala via a really long hose, and test it. Yup, it worked better. After looking into a GM made vacuum tank and reading about how it all works, I started looking more into adding a pump. The tanks only collect vacuum, they don't produce additional. Adding in a pump will do that, and many racers need them for their big cam cars. There are some GM cars that have vacuum pumps, but after researching it I concluded that an aftermarket would be not only simpler to do, it would be better for what I need.



One click got it quick. Summit Racing had a deal on a CVR vacuum pump and reservoir combo. The pump included everything pre-done but power supply and ground. This one has the relay and pressure switch pre-installed which saved me that hassle. Mitch had just installed one on a car this spring too, and it seemed to make the most sense. The pump works simply by reading your vacuum signal. If there's no vacuum, it runs and builds up to the 22 pound cutoff. Then it sits until that vacuum reading drops too low and runs again. It's pretty quiet too.



Installation of the pump went pretty well, though sneaking it around my air intake tube made it a little difficult. It found a nice home nearly hidden under the left fender mounted onto the fender well. The canister mounted to the core support with a couple simple L brackets and sits nicely out of the way. It has a vacuum gauge on top, so I can easily see what's going on.

I tested the system by powering it up and letting it sit for a couple hours, then overnight to see how fast the stored vacuum would last. No big leaks, and it only lost a little overnight. Time for the test drive.

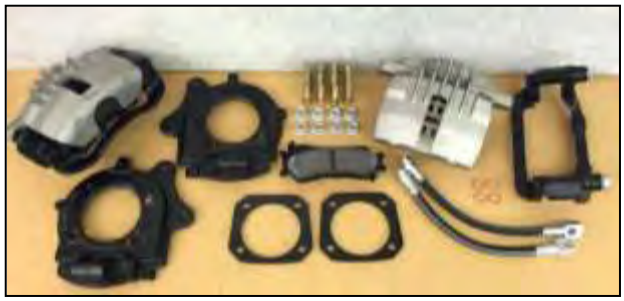
Success! Well, sort of. The pump works, the brakes worked better, but they still didn't have that grab I needed. After a couple trips around the block and re-checking for fluid leaks, it was time to bed the brakes in. Directions say to go 45, then down to a stop in a nice, easy but no granny-like fashion. Repeat a bunch of times to get it warm. Check. Get up to 60, then get on

the brakes firmly, but not to a stop. Repeat several times. Check. I could tell that as they were getting warmer, things were stopping better. Since then, I have gone out several other times to just drive and noticed that once warm, those brakes work pretty well. I'm still playing with the prop valve, seeing what setting works best, but it is WAY better than I have ever had in this car.

Next up: new wheels so I can lower the car down over the tires better. Hopefully they will be on by the Street Machine Nationals show.
The prices shown are retail, I paid less. There are good deals out there, go find them.

A good resource for master cylinder and booster or brake tech info is Right Stuff Detailing. Their website is:

www.getdiscbrakes.com




Cool Tool: SPX/Kent-Moore # J-45405 brake line tool

There are pipe flaring tools; then there are really good pipe flaring tools. This is a dealer/professional shop unit and if you did this sort of thing a lot, would be well worth the money. I found a Mastertool version on the web for $275. The process is pretty simple: insert cut end of pipe into the holder, insert proper flare or die, and squeeze the lever a bunch. Depending on the die you use, it will flare the end, do bubbles, or 45degree inverted. I don't think I could ever go back to that other thing I have.



Parts list/Price breakdown (retail)	
Rear axle: Fridley Auto Parts	$150
Master cylinder/Hydraulic booster combo from Right Stuff Summit Racing RSD-G100305	$113
Wilwood proportioning valve # 260-8419	$42
AC Delco rear disc calipers # 18R1487/18R1488	$132ea
Backing plate spacers Ebay user s10warehouse	$30/pr
AC Delco rear rotors # 19287182	$50ea
Brake fluid	$7
Posi additive GM # 88900330	$13
3/16x30" long brake line NAPA # 813-1205 $8ea x3	
¼" to 3/16" brake line adapter NAPA # 641-3307	$3
3/16" brake line tee NAPA # 702	$6
¼" x 8" long brake line NAPA # 813-1226	$5
3/16" x 8" brake line NAPA # 813-1201	$4
Hydraulic brake hoses (99 S-10 2wd) NAPA # 380469	$18ea x2
Banjo bolt GM # 11569590	$10ea
Prop valve chrome mounting hardware Menards	$11
Rear axle gasket NAPA # RDS55029	$9
80w90 axle fluid	$9ea
Vacuum pump/canister kit Summit # CMB-CVS01	$382

If you go with the 88-97 Camaro rear disc pieces, you can omit the spacers from eBay. Also, most hoses are for late model design and are 10mm. Russell makes a 10mm to -3 male fitting # 641471 and the 10mm banjo bolt is # 640680. GM copper washers are # 21012386.