

CyconXc's RC Trophy Truck Build Guide



Xc

Background

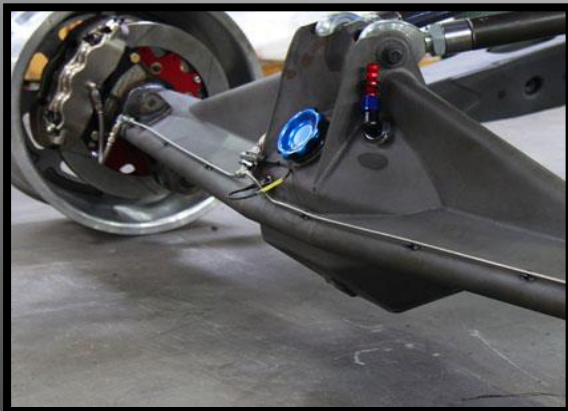
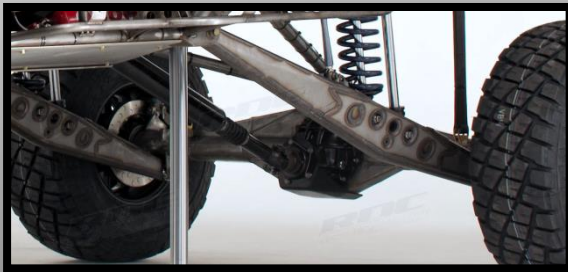
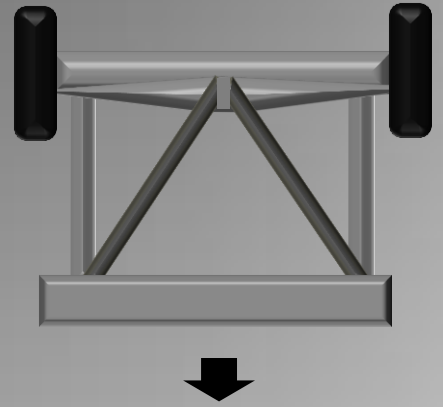


If you don't already know, the trophy truck is the ultimate off-road racing machine. Containing a two man crew of a driver and their co-driver, racers compete in a variety of events ranging from 250 mile circuits to point races covering over 800 miles of desert. Unlike your average SUV, trophy trucks are made to handle the roughest terrain at the highest speeds possible. They accomplish this with over 20 inches of front and 30 inches of rear suspension travel, which can absorb ruts and whoops up to 3 feet deep. Trophy trucks are hand built out of 100's of feet of chromoly steel tubing to keep these trucks as light as possible.

Trophy trucks average an astonishing 800hp that can propel them up to 120mph through roads where normal trucks would crumble. If racers experience a flat in the middle of a race, there is no pit crew there to help. All mechanic break down during a race are left to mercy of whatever the team has on board. Racing these beasts is not cheap either, a top class trophy truck can cost up to \$800,000, and that's why I'm sticking with an RC to enjoy the awesomeness of trophy trucks.

The Solid Axle

Now that we've gone into what a trophy truck actually is, we can go further into the design features of these trucks. Even though these trucks are custom made, the main component of these trucks go across the board. The main feature is its solid axle, which works its massive wheel travel and articulation. Since these trucks are 2wd, it is immensely important for the rear wheels to stay in contact with the ground as much as possible. The application of the 4 link is the simplest way of attaching the rear axle. The rear shocks, sway bars and driveshaft will then attach to the bottom 2 links and the axle to complete the rear end.



Chassis Design

For you to be able to build a RC trophy truck, you need to decide what type of truck you want to build. Out of the popular drivers, there is 3 generic types of chassis designs. The most popular type by far is a chassis that incorporates side-by-side spare tires. Now I will tell you how to build you truck based on the type of chassis you chosen truck has.



2 Side-by-Side



2 Vertical



2 Stacked



1 Laid down

The Front End

The front end of a trophy truck is the business end of truck, it not only has to absorb the bumps, it's the first part of a truck to experience it. Though it is a scaled up version, it's not much different than your average ATV or dune buggy's suspension. It uses a double a-arm design with a shock running through the middle. The front end takes the hard hits, so it needs to be strong. Most trucks also run sway bars in the front to minimize body roll.



Building Your Trophy Truck



DISCLAIMER

Building these types of trucks from scratch is no easy task. If you are not prepared to heavily plan, cut your own parts and assemble yourself, this might not be for you! The process of building could take a couple weeks or evens months, but your truck will always need attention and maintenance.

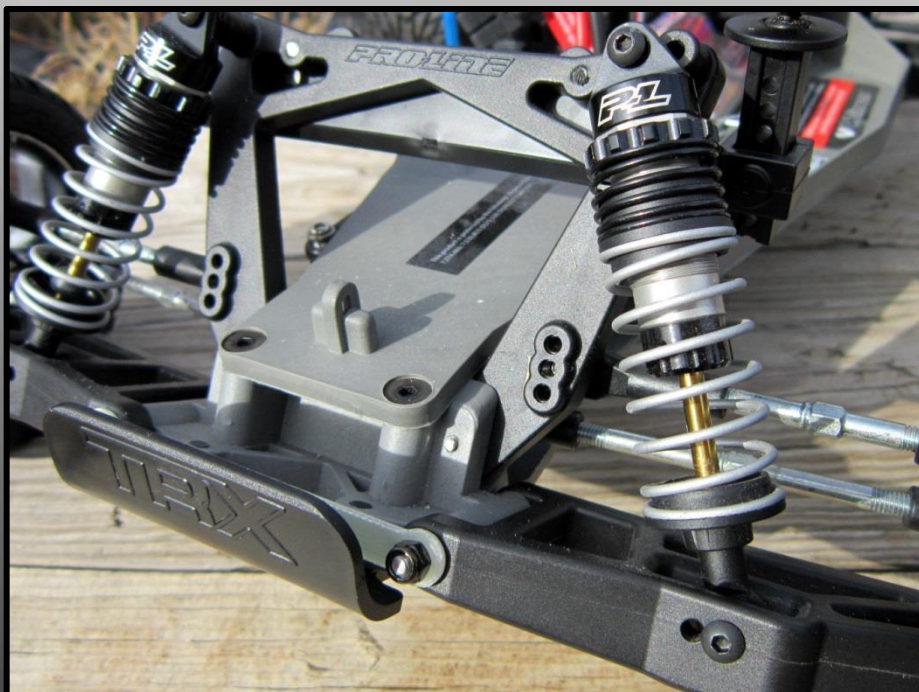
Some of the tools I used:
Ryobi Angle Grinder, drill and drill press, counter sink bits,
Thermal Arc 95S TIG welder, Dremel, Table Sander

Step 1: Front End

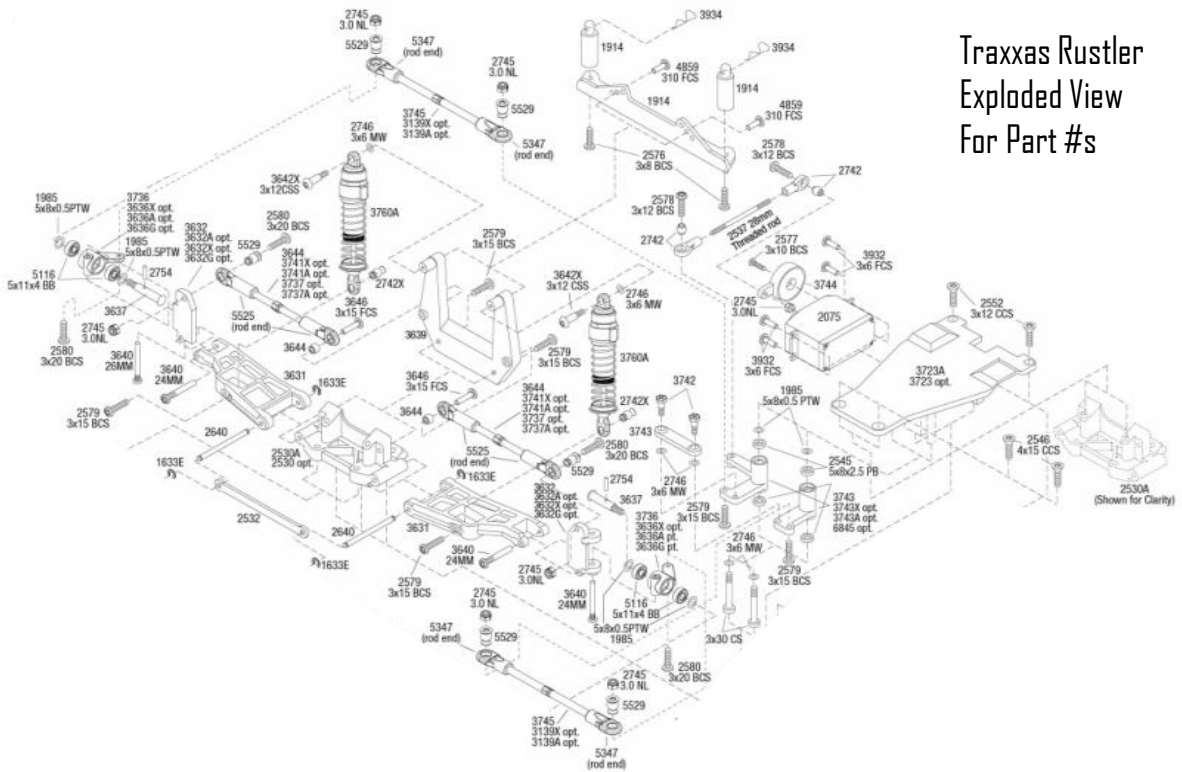
The front end will determine how you build the rest of your truck. The easiest and cheapest option is using the front from a Traxxas Rustler. The bulkhead makes this the easiest way to bolt it onto the chassis. It would be much easier to try and buy a Rustler roller, but if you can't you have to buy the parts to build your own.

What you need:

- Slash/Rustler A-arms
- Slash/Rustler Front Shocks
- Slash/Rustler Turnbuckles
- Slash/Rustler Tie-bar
- Slash/Rustler Front Hinge Pins Set
- Slash/Rustler Steering Knuckles/Blocks
- Slash/Rustler front tower
- Slash/Rustler Bulkhead
- Slash/Rustler Steering Rack
- Slash Body Posts



Step 1: Front End



Traxxas Rustler
Exploded View
For Part #s

REV 130218-R01



Specifications on this page are subject to change without notice. Every attempt has been made to ensure the accuracy of this drawing, however Traxxas cannot be held responsible for typographical or other errors.

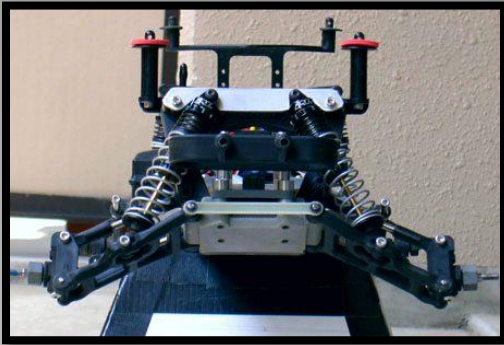
See Parts List for a complete listing of optional accessories.



Step 1: Front End

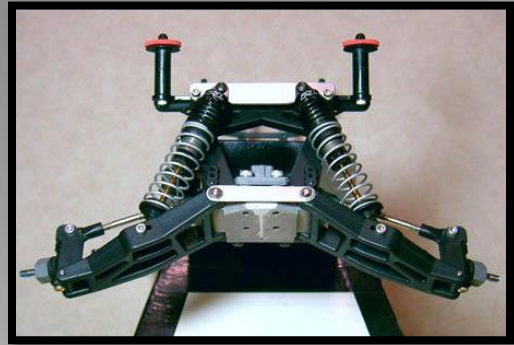
There's 2 ways you can build the front, Stock or narrowed bulkhead. To narrow the bulkhead all you need is a Dremel and a cut-off wheel attachment.

#1 With the stock bulkhead and stock or RPM length arms.



Pros: Requires no modification, can use optional aluminum bulkhead or shock tower

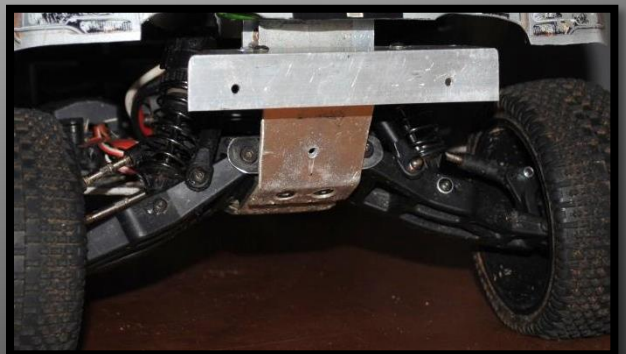
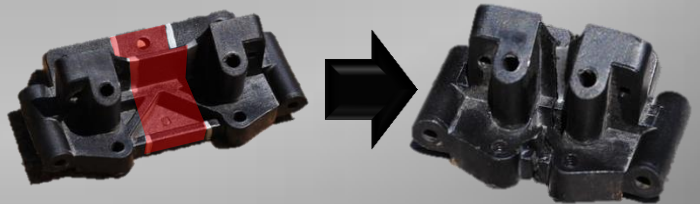
#2 With narrowed bulkhead and ProTrac or Jato arms.



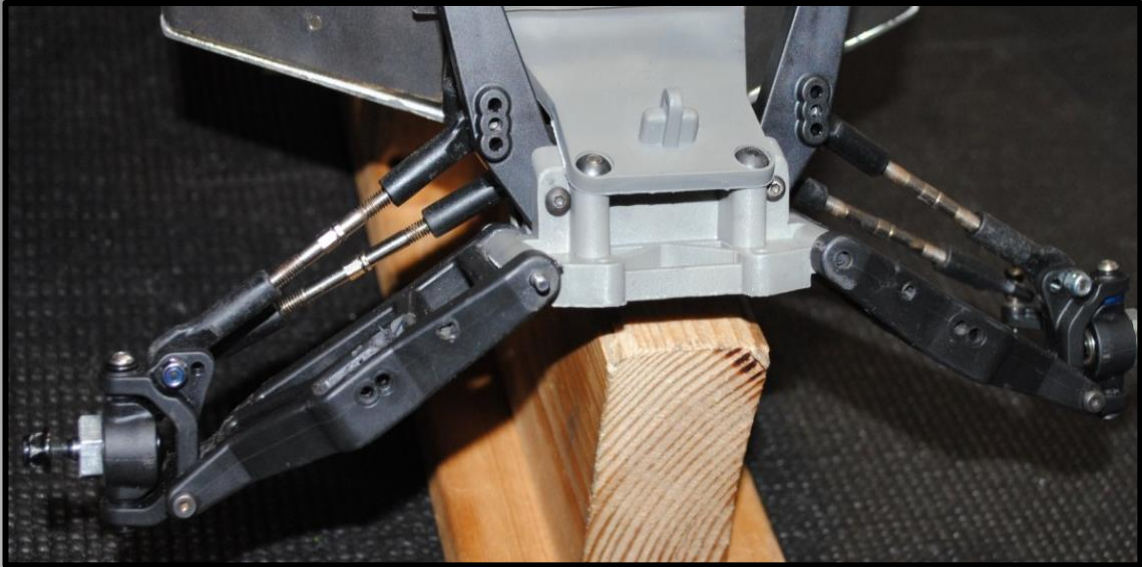
Cons: Requires modification, cannot run aluminum bulkhead or shock tower



OR

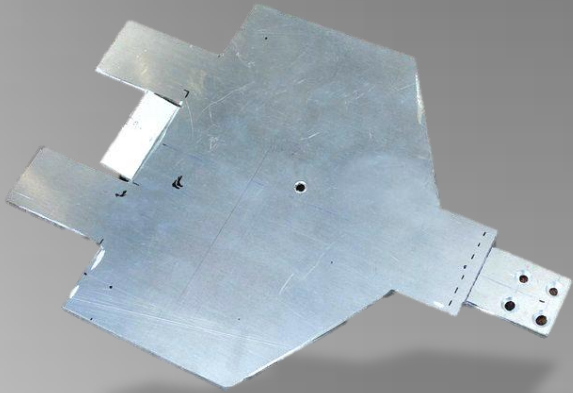


Step 1: Front End



Step 2: Sheet Metal Design

The main structure of an RC trophy truck is its metal chassis and twin vertical plates.



For my build I used **.125 in. (1/8) Corrosive Resistant sheet Aluminum** for both the bottom chassis and vertical plates (I'd recommend getting a 24" x 48" piece). You don't want to use steel for these, it'll be way too heavy. 1/8 inch for the Aluminum is the perfect thickness, any thicker would be too hard to cut and any thinner would be too weak.

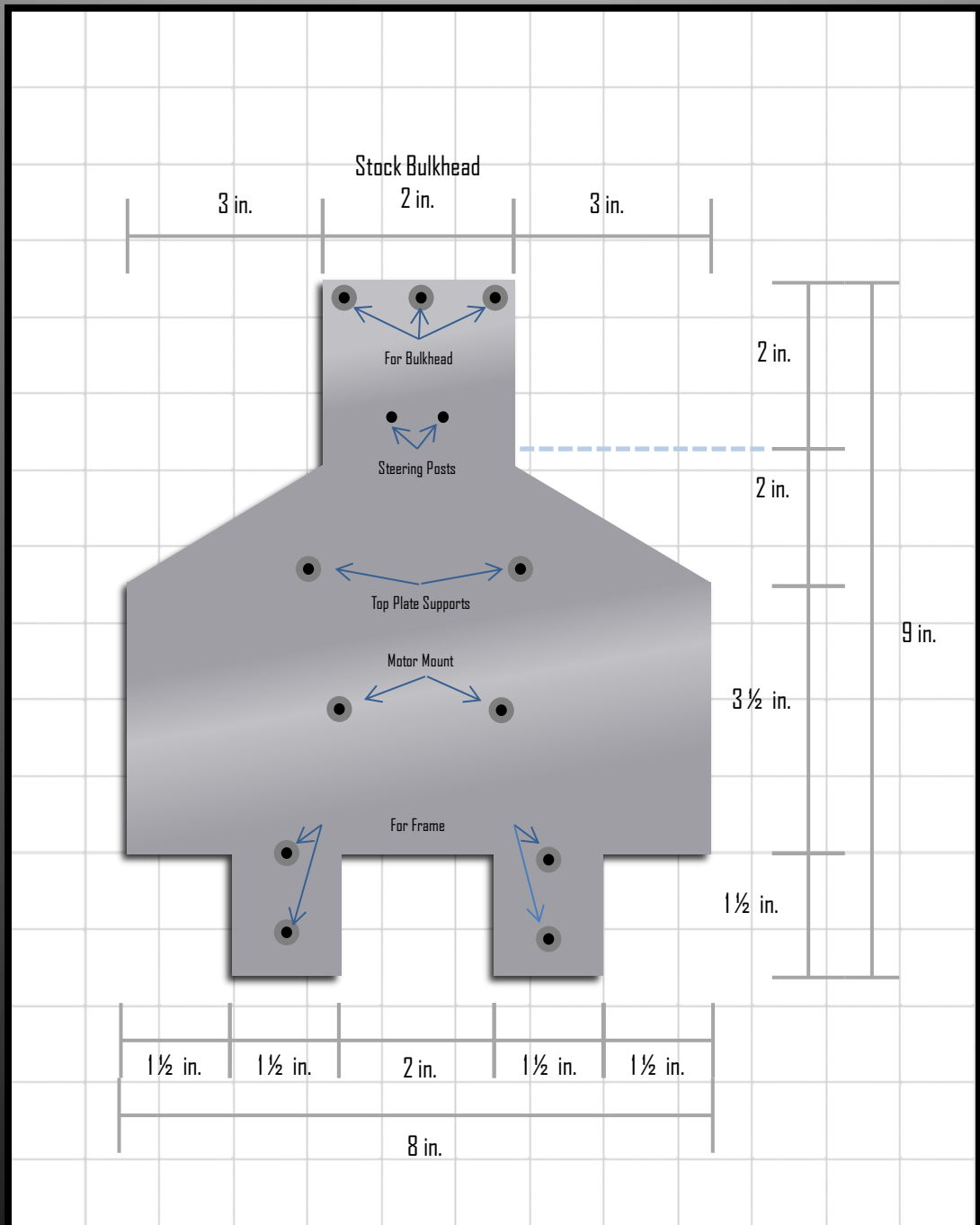
Here's where I got mine: <http://www.mcmaster.com/#standard-aluminum-sheets/=pit2zs>

Once you have your metal you need some tools to cut it out. If you don't have access to a metal cutting shop with CAD software, your only alternative is to cut it yourself.

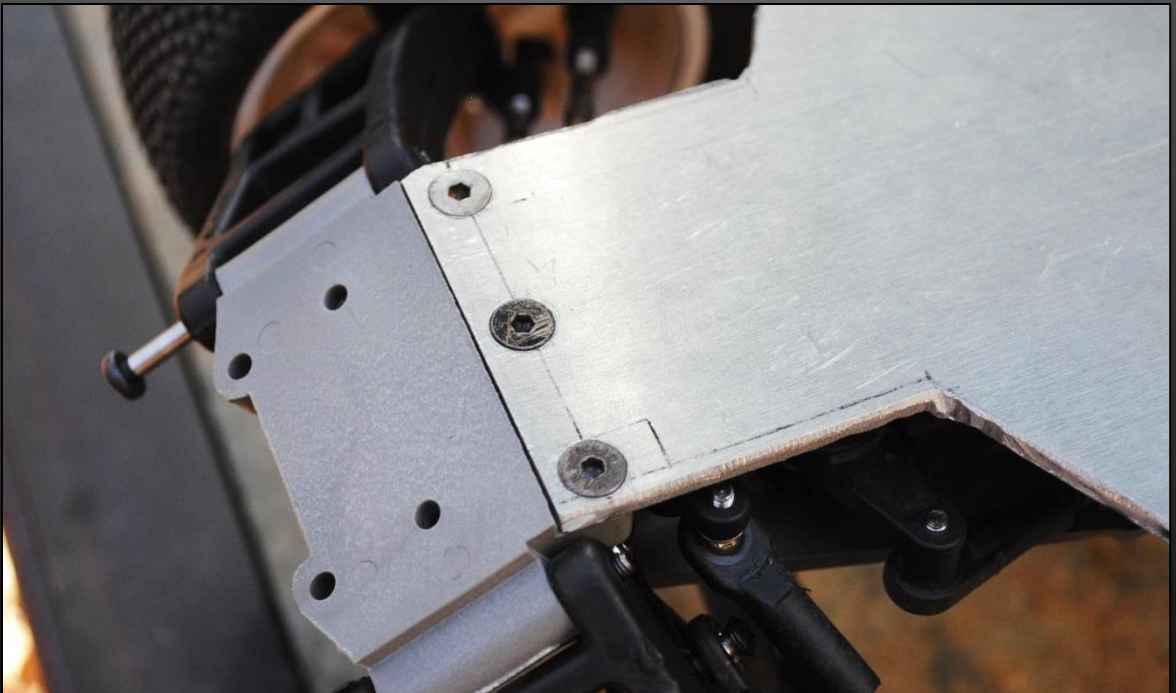
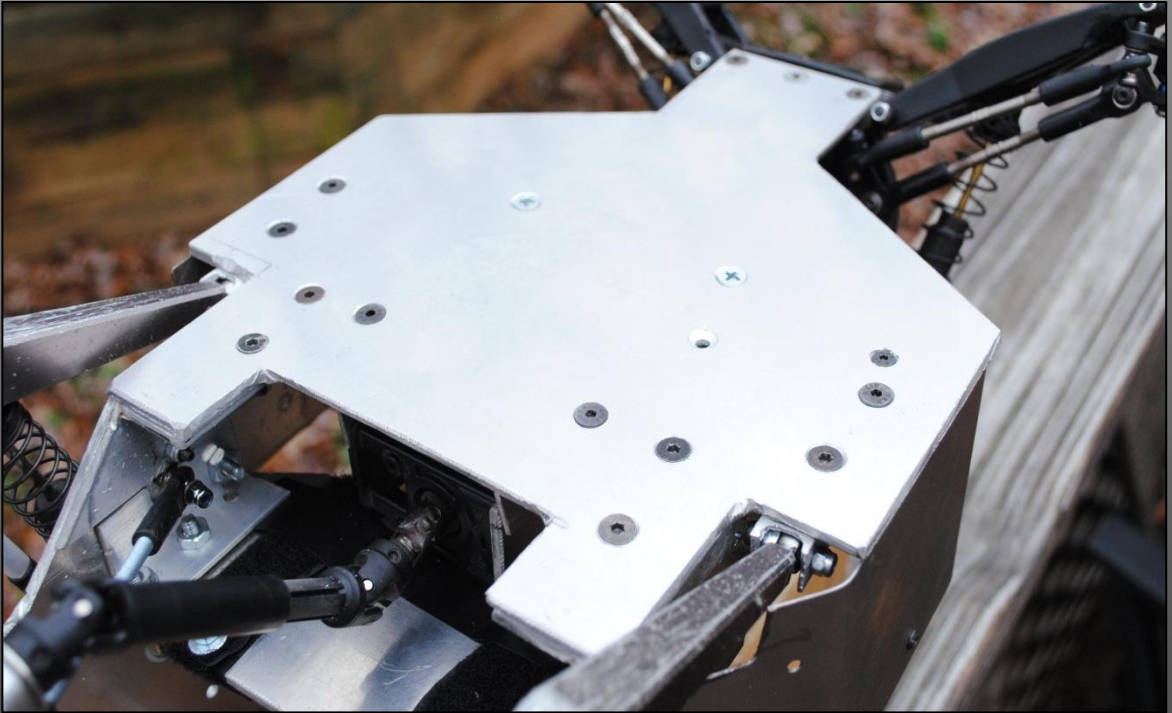
Needed tools:

- Angle grinder with a metal cutting blade
- Drill press or drill with metal drill bits and a countersunk bit
- Dremel with a variety of sanding bits, and cut-off wheels

Step 2: Sheet Metal Dimensions



Step 2: Sheet Metal Dimensions



Step 3: Frame Design : Concept

The frame of these trucks is their back bone, literally. Many important things will attach to the frame. It is very important that your frame pieces are symmetrical so it is easy to mount on your chassis when you're done. The easiest way to plan out your frame is to make it out of cardboard or paper.

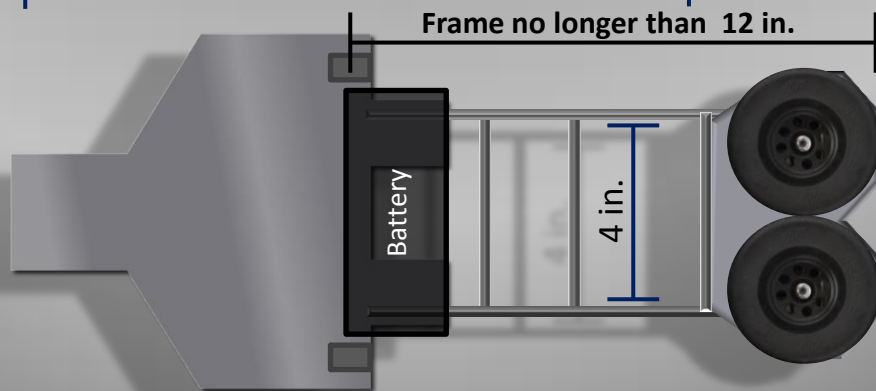
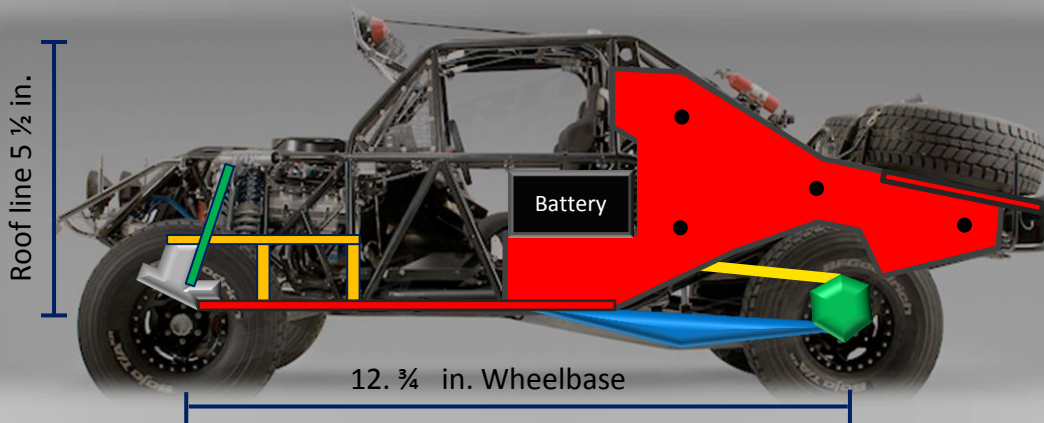


Step 3: Frame Design

The trophy truck you decide to make will determine the shape of your chassis plates, unless you just make a generic shape that's not a specific truck.

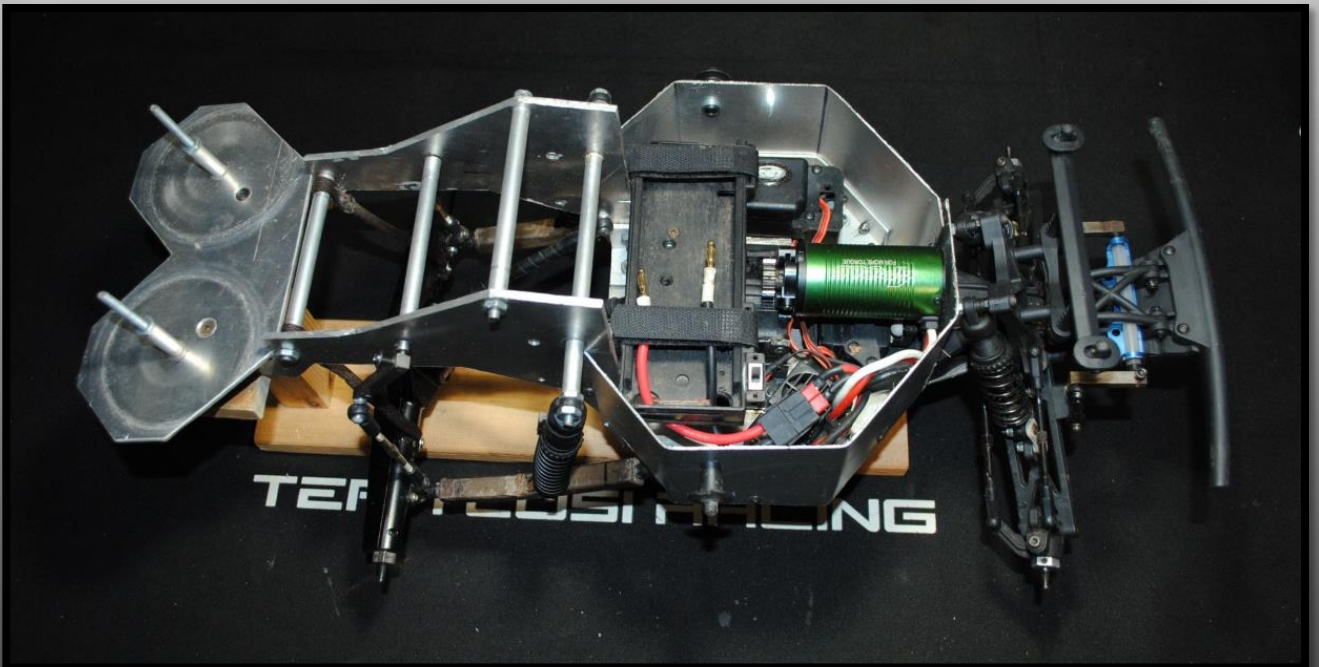
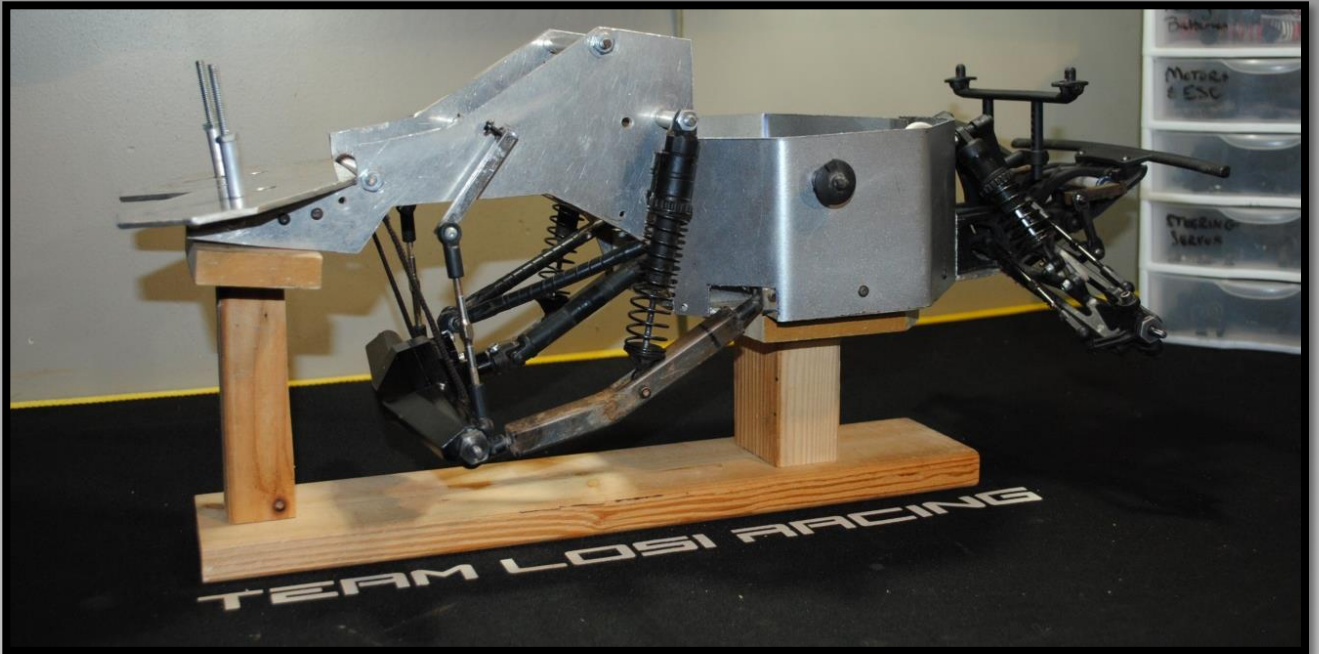
Geiser Bros Chassis: 2 Side-by-side

Bryce Menzies, Andy McMillin, Jesse Jones, Cameron Steele, Rob MacCachren, Jesse James, Johnny Voudouris and many others...



Step 3: Frame Design

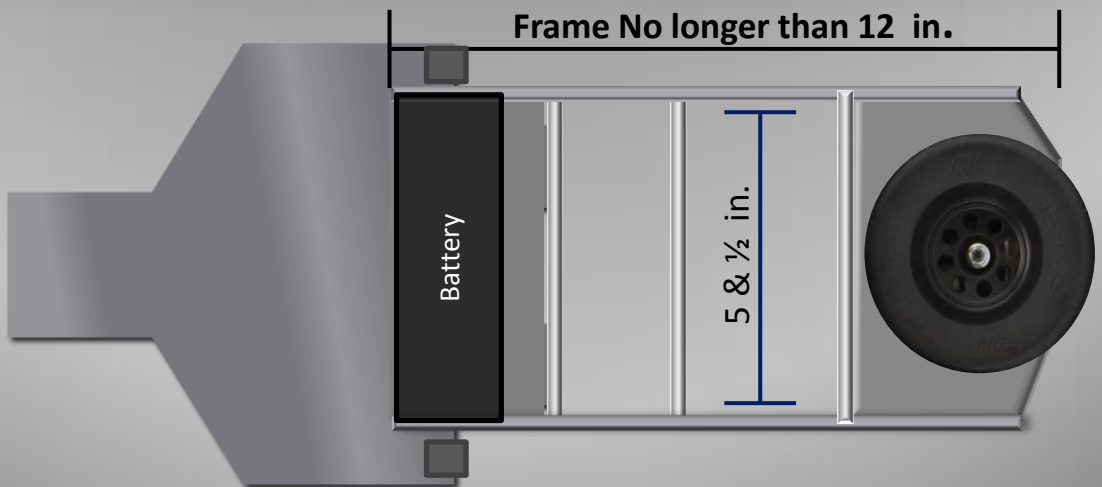
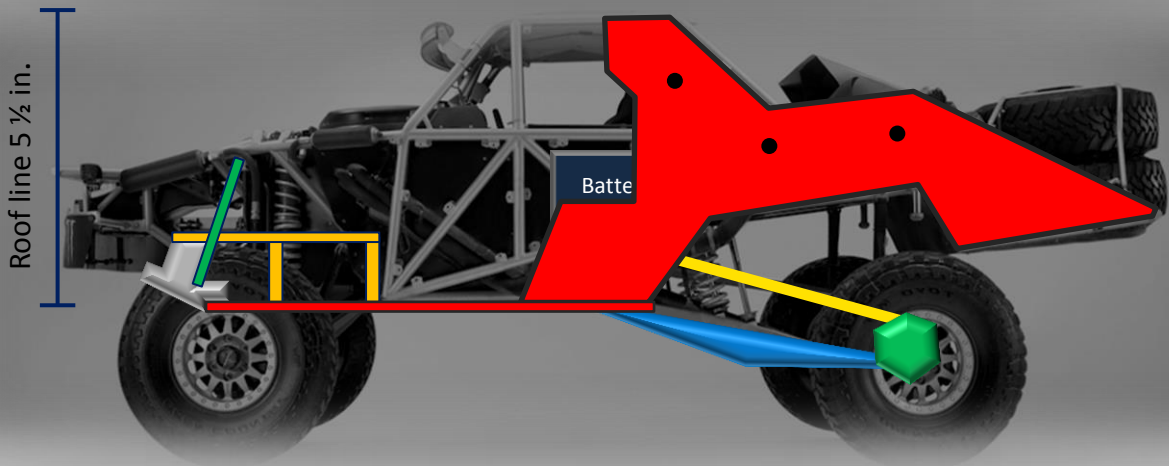
This is my brother's Geiser Bros Chassis



Step 3: Frame Design

NSP-1 Chassis: Dual Stacked Spares

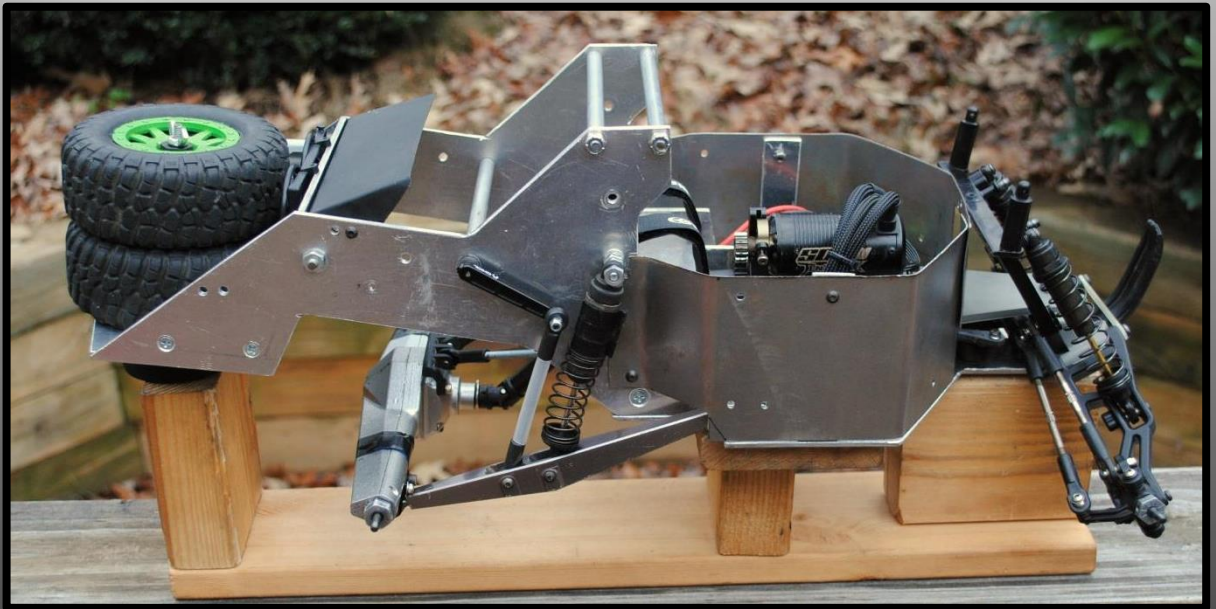
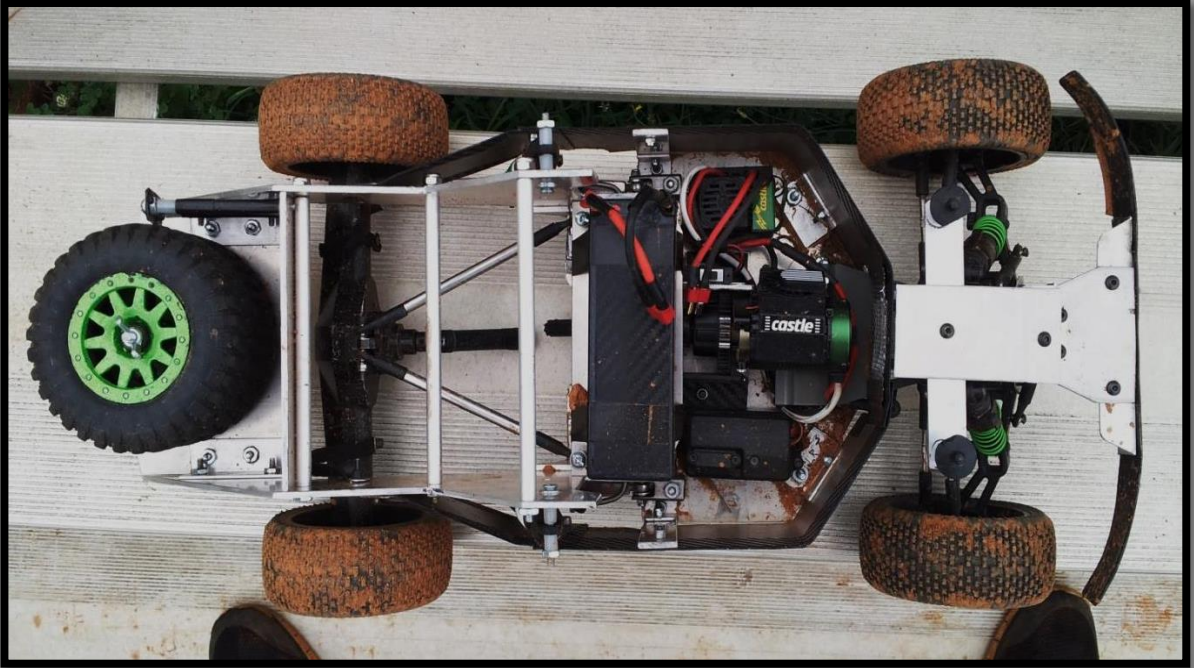
BJ Baldwin NSP-1 chassis



Step 3: Frame Design

NSP-1 Chassis: Dual Stacked Spares

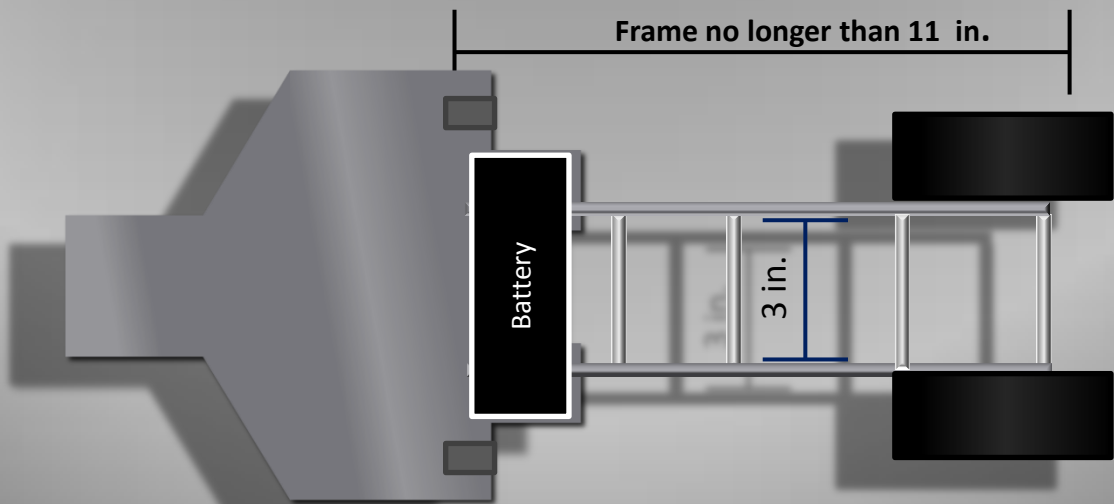
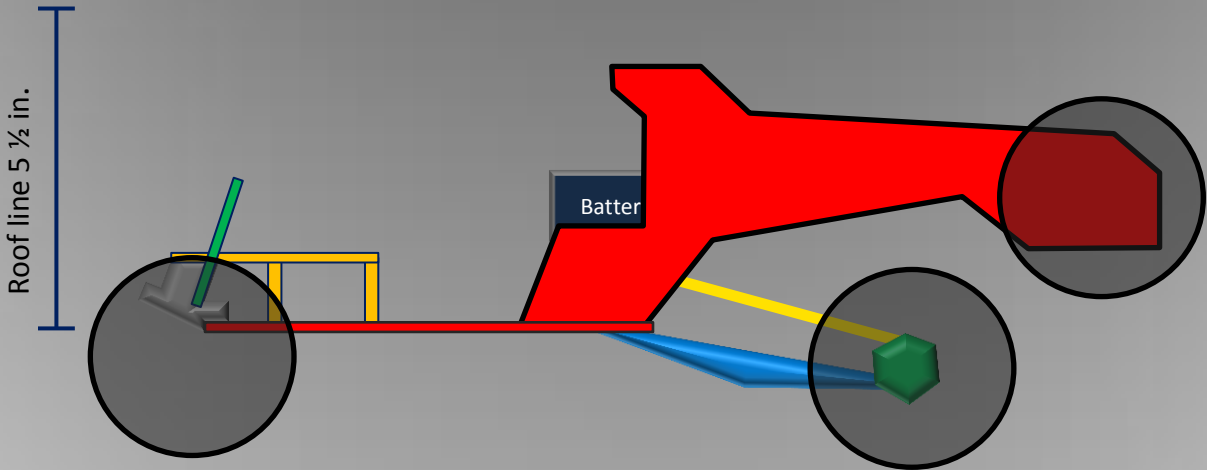
BJ Baldwin NSP-1 chassis



Step 3: Frame Design

Generic Trophy Truck – Vertical Spare Tires

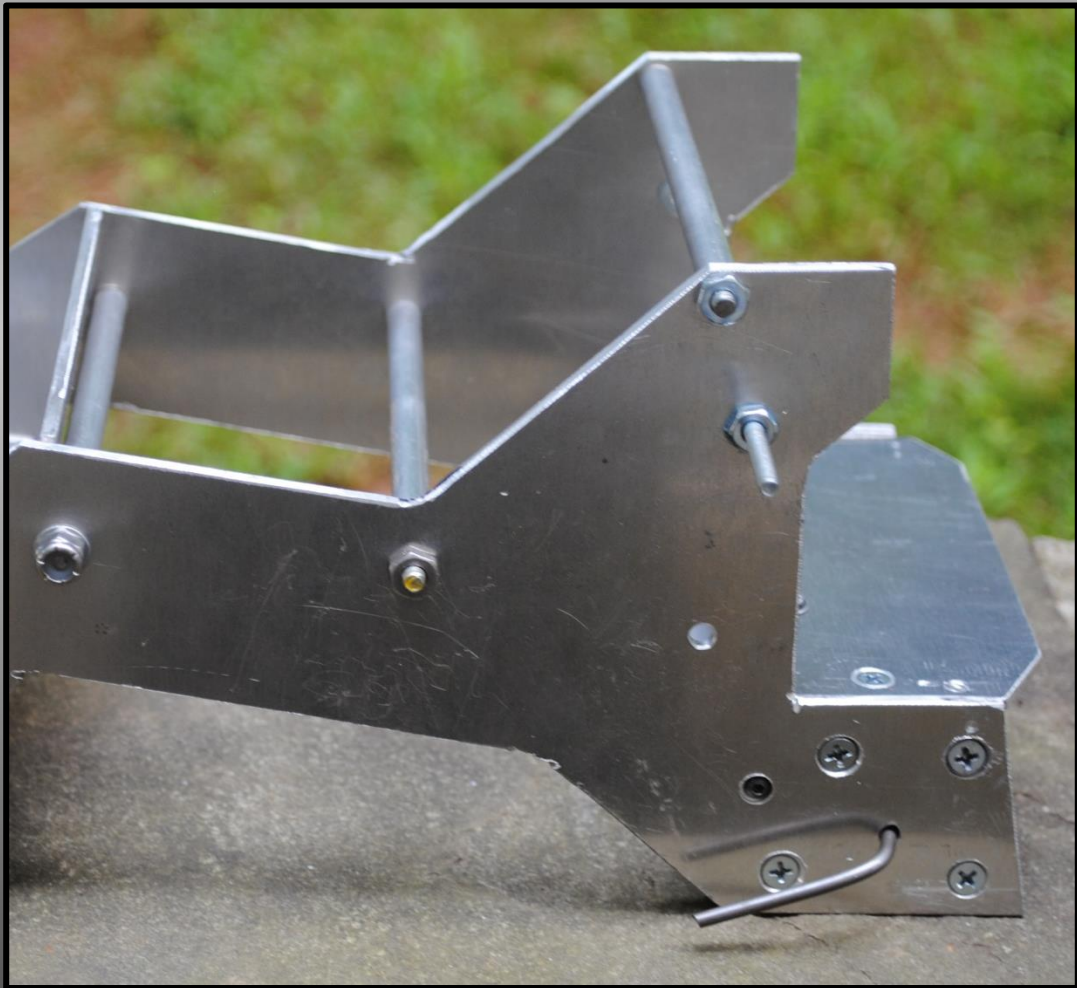
Master Craft TT30



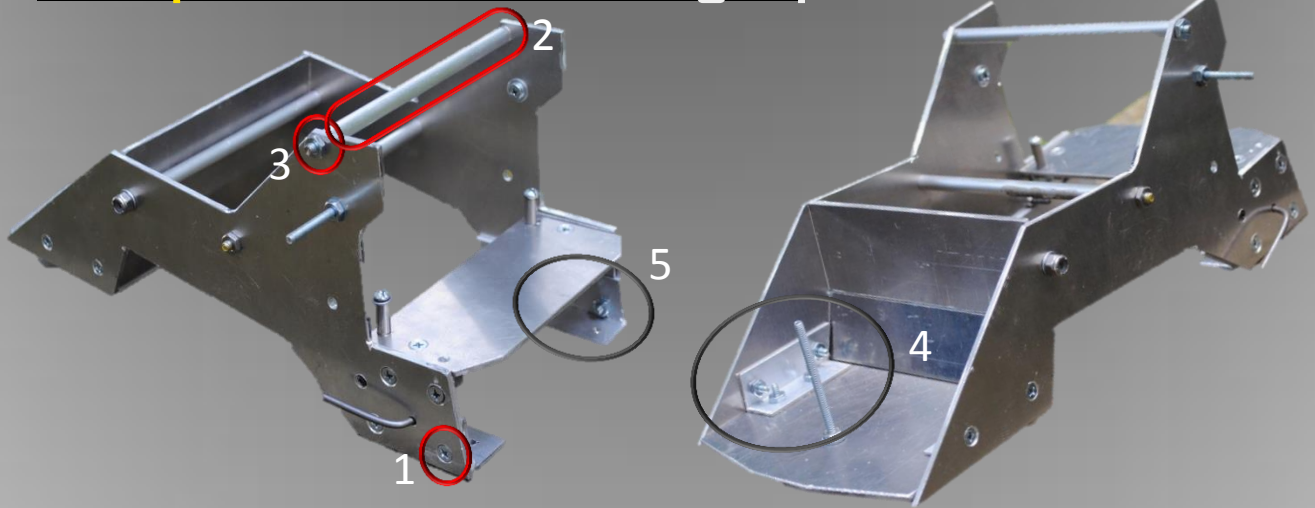
Step 3: Frame Design pt 2

Like I said, it's very important that both your frame pieces are identical. If they're not, things will be crooked and it will be difficult to line things up.

When you're ready to drill holes, sandwich the 2 pieces together so your holes are in the exact same spot on both sides. Measuring can work, but you'll always know it will be straight if you drill through both at the same time.



Step 3: Frame Design pt 2

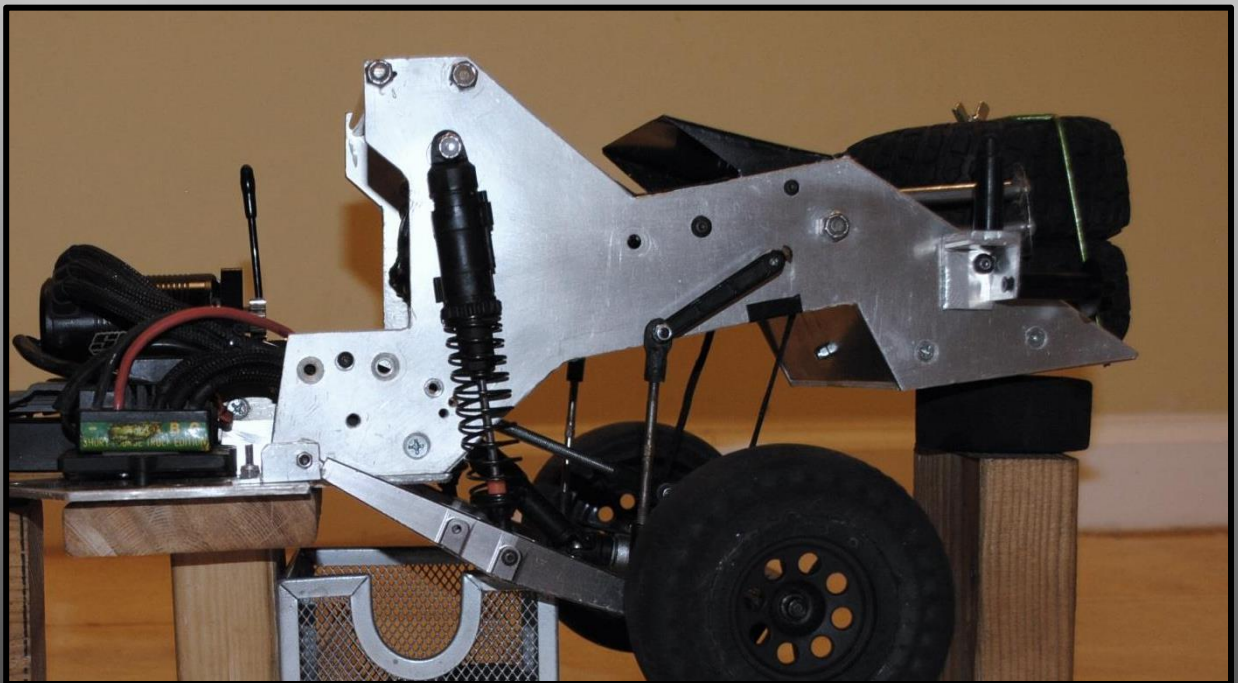
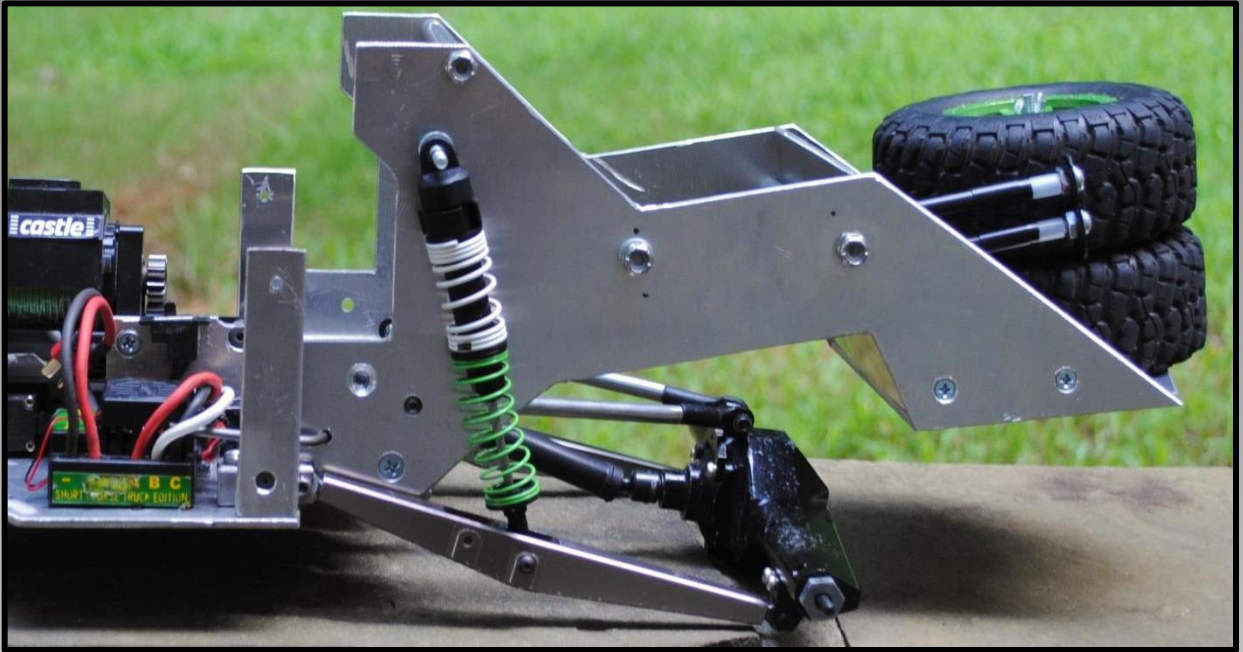


After you cut everything out, it's up to you what type of hardware you want to use. I decided to go with Philips machined screws; they were easiest to get at my local hardware store. (Home Depot) The screws labeled (1) are **8/32 in. Philips screws** ranging from 1 – 2 ½ inches, paired with **8/32 nut bolts**. The frame supports are made of **5/8 in. Aluminum Tubing** (2) which surrounds the **10/24 in. threaded rod** (3) that I cut to fit, combined these support the whole frame.

The area labeled (4) are **¾ in Aluminum L-brackets**. Those connect the rear area of the frame as well as supporting the battery tray. Parts labeled 5 are **1 in. Aluminum I-brackets** that are a little thicker. The extra strength is needed where the frame connects to the chassis.



Step 3: Frame Design pt 2



Step 3: Frame Design pt 2

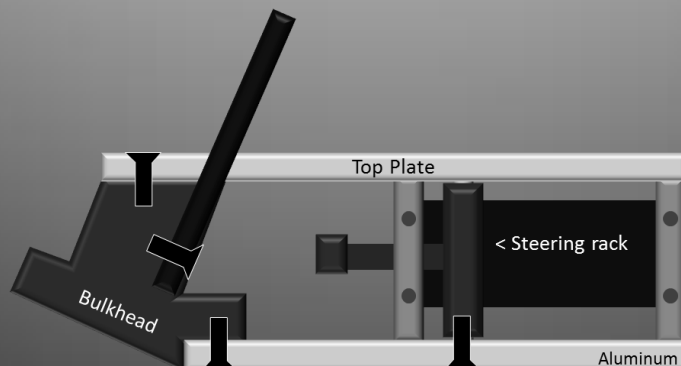
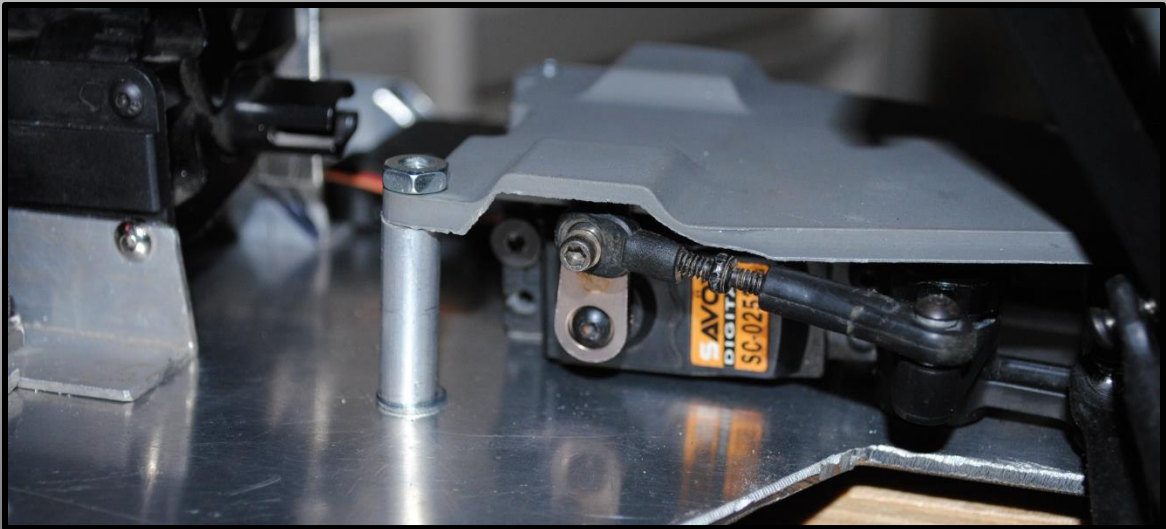
It would be a good idea to try and incorporate a carrying handle somewhere near the top of the frame for easy transport.



Step 4: 2wd Slash Front Assembly

When you get all the parts for the front it's a pretty easy after that. Whether you narrowed the bulkhead or not, you need to attach the bottom holes of the bulkhead to the chassis. The narrow bulkhead will require either Pro-Line Pro-Trac or Traxxas Jato arms for the correct width. You have a couple width combos to fit a normal SCT body.

1. Stock bulkhead, Stock arms, and Slash offset wheels
2. Stock bulkhead, ProTrac arms, and 0 or +3 offset wheels
3. Narrow bulkhead, ProTrac arms, and +3 or Slash offset wheels
4. Narrow bulkhead, Jato arms, and zero offset wheels
5. Narrow bulkhead, Jato arms, and +3 or slash offset (wheels will stick out of the body)



Step 5: Motor and Driveline

This part of the truck is crucial if you want your truck to be reliable. A sturdy motor mount and strong driveshaft combo is necessary if you don't want to constantly make repairs. You can use a stock Slash 2wd transmission or use what I used, the **SCTE motor mount/center diff**. It was originally made for 8th scale competitive racing so you know it's reliable. You can't beat it because it uses mod 1 *and* it centers the motor.



SCTE Motor Mount

<http://www.dollarhobbyz.com/losi/losi-1-10-ten-scte-motor-mount-top-plate.html>



SCTE Center Diff

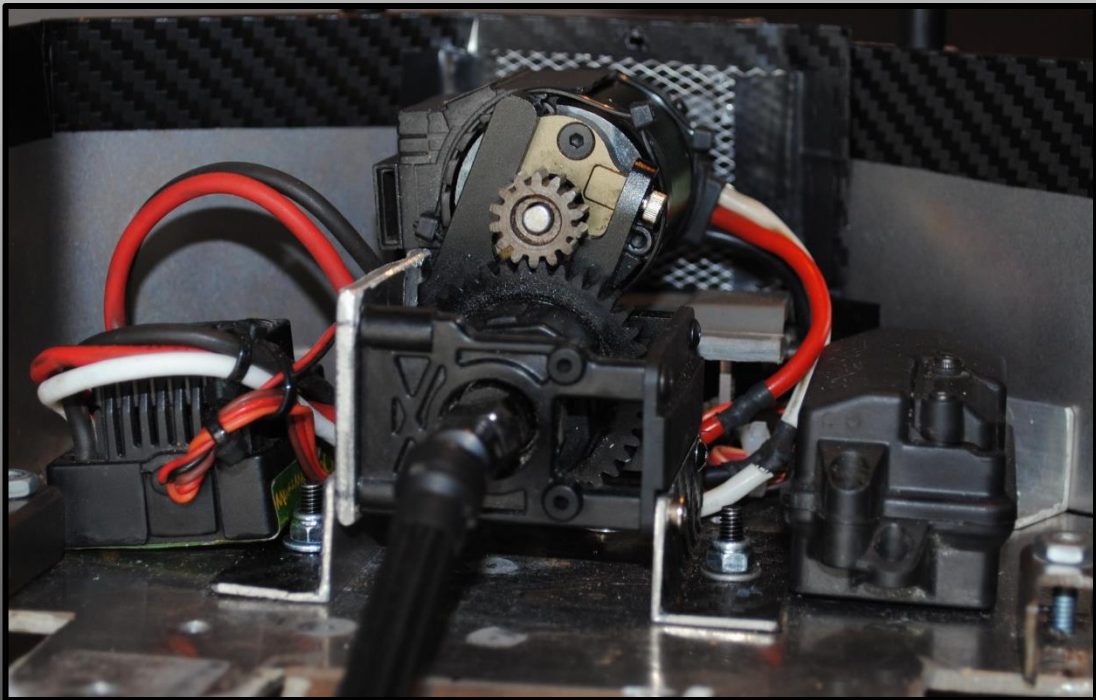
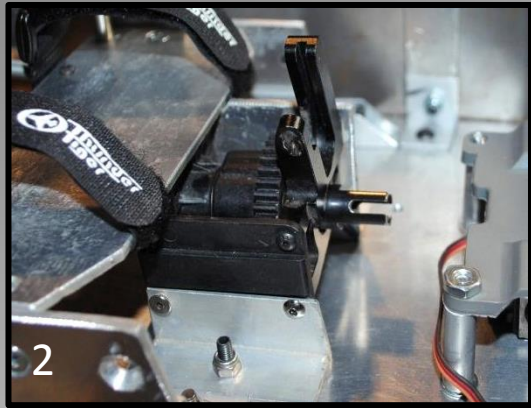
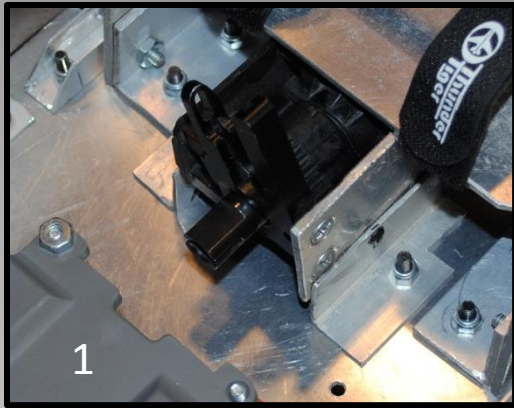
<http://www.dollarhobbyz.com/losi/losi-1-10-ten-scte-center-differential.html>



Complete Motor Mount Assembly

Step 5: Motor and Driveline

To finish the motor mount you'll need to make a small metal plate where the assembly usually attaches to the SCTE chassis. Once you have that plate created and attached, you need to cut two $\frac{3}{4}$ L-bracket pieces to hold the motor mount. At this point it should be able to sit flat on a table (picture 1 & 2).

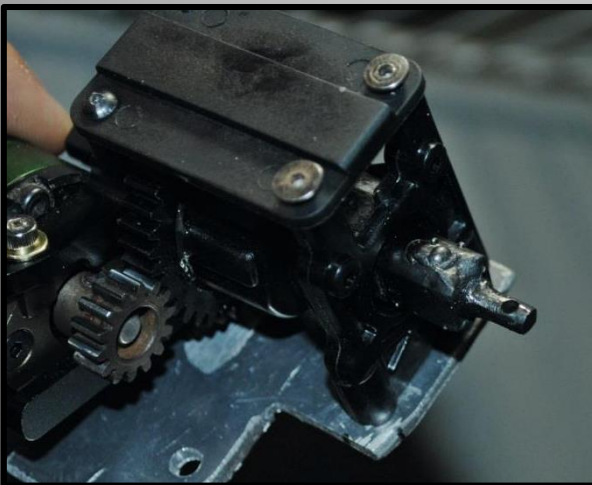


Step 5: Motor and Driveline

The next step requires a small weld to be able to attach the driveshaft. You're going to be taking the axle stub from an E-Revo or Revo driveshaft ([TRA5451X](#))

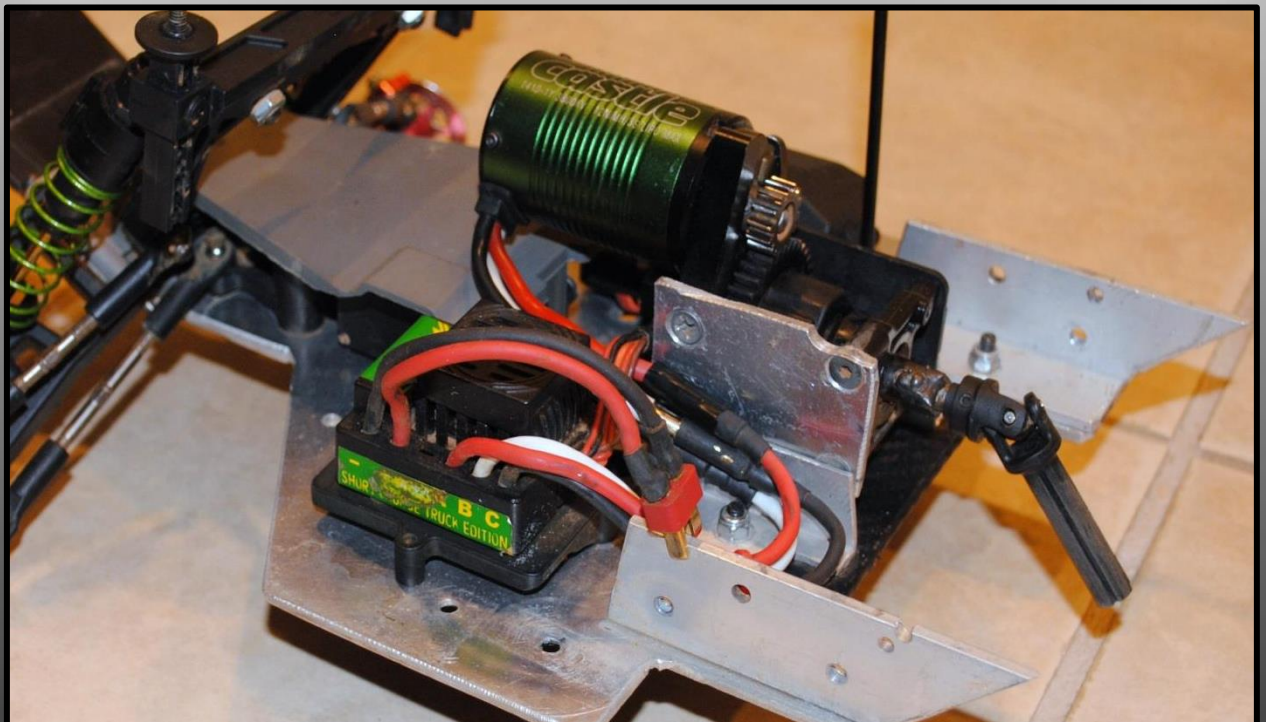
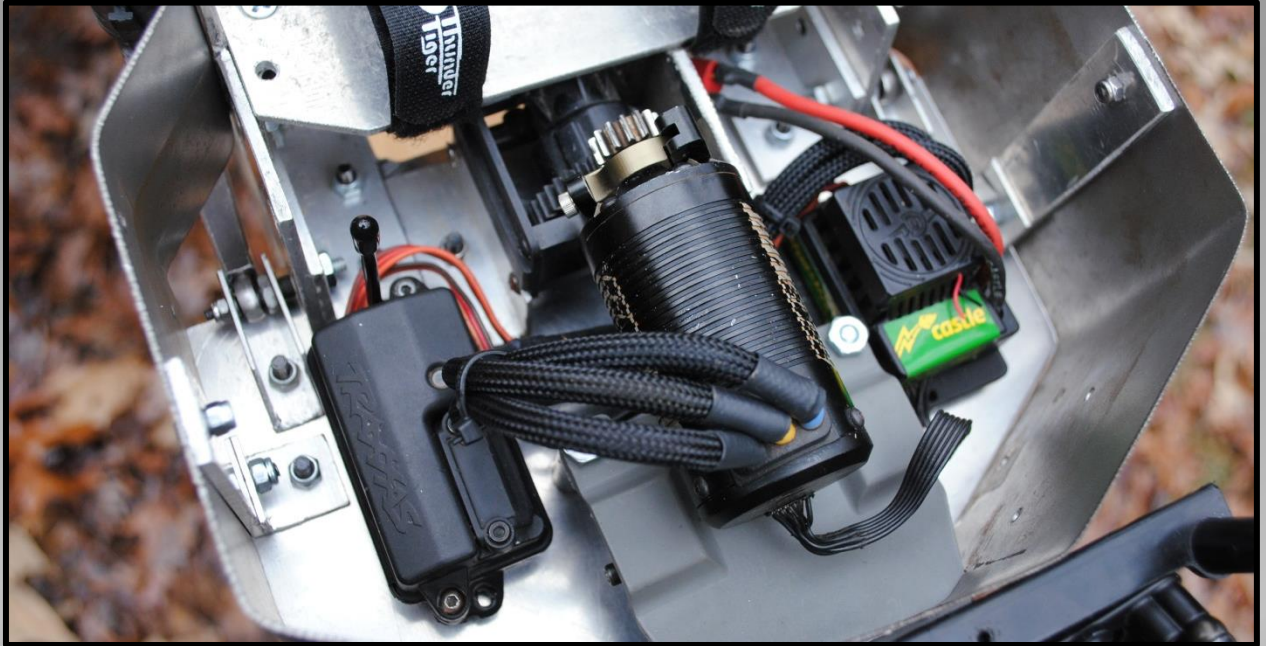


When you're ready to weld it on you need to make sure the small piece is centered all the way around. You could probably use small pieces of paper to keep it still. If it's not centered then the drive-shaft will wobble. You also have to make sure it sticks out enough it attach the drive-shaft. Once you have it in the right position, just hit it with a couple welds and sand it down, then you're done.



Step 5: Motor and Driveline

Then just mount up your electronics.



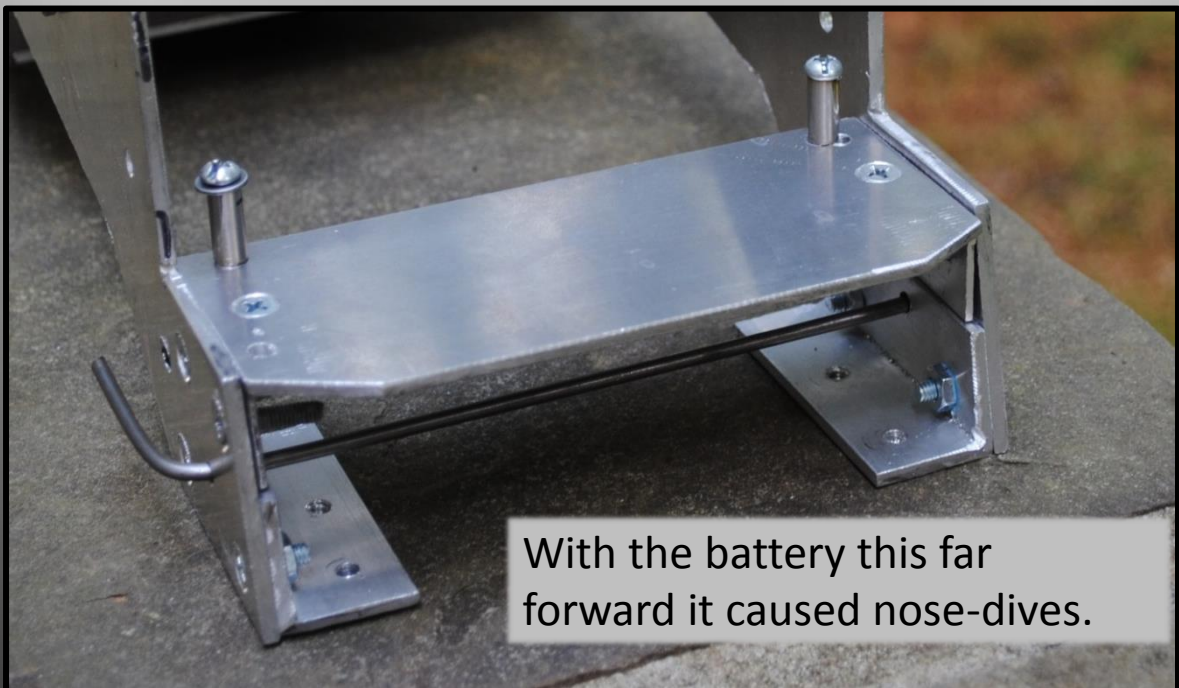
Step 6: Battery Placement

Like all other RC vehicles, it's important to keep all weight as low as possible. Even more important for 2wd rc cars, you need a good amount of weight over the rear wheels for better traction. With this in mind, the placement of the battery is a very important tuning aid.

- **Be mindful of the battery mounting location when designing your frame.**

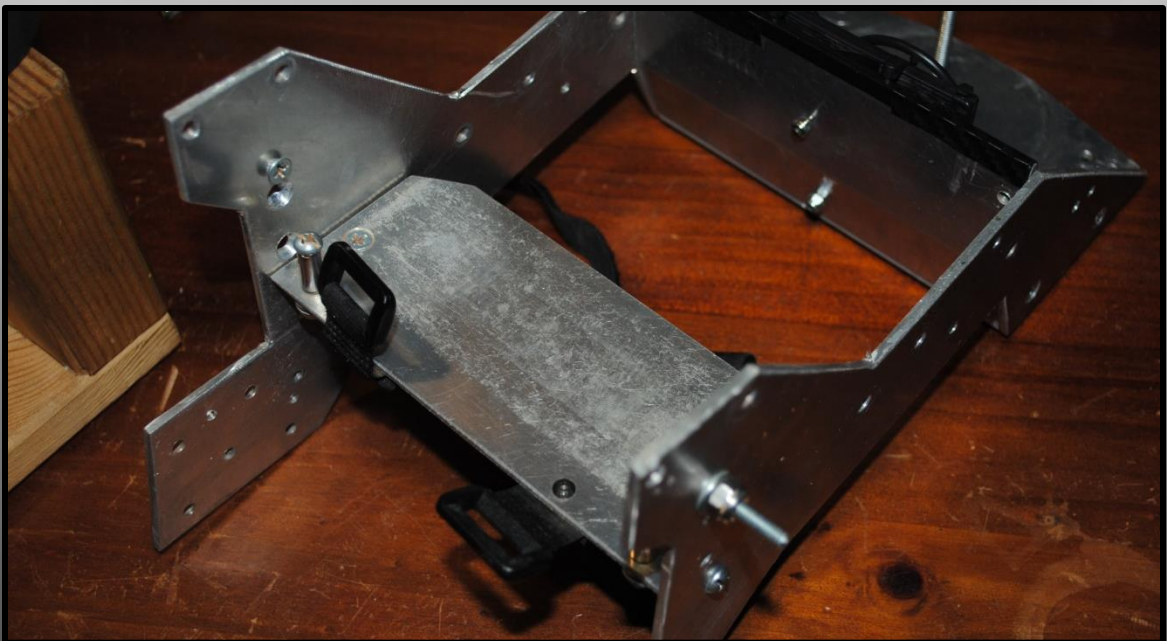
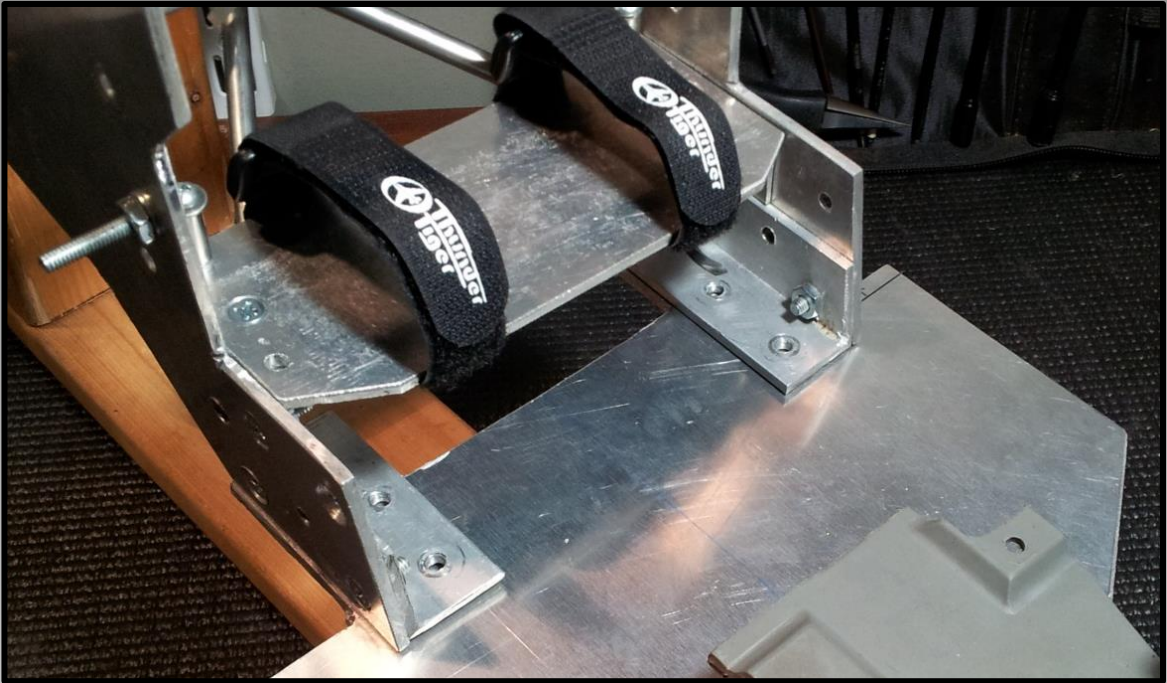
Keys for battery placement:

1. **Easy access** – make it easy to switch out your battery. There's nothing worse than having to take 5-10 minutes changing out a dead battery.
2. **Balance** – mount your battery in a central location that helps to balance out the weight of the truck. With your electronics already up front, mounting the battery somewhere in the rear will work best for weight distribution.

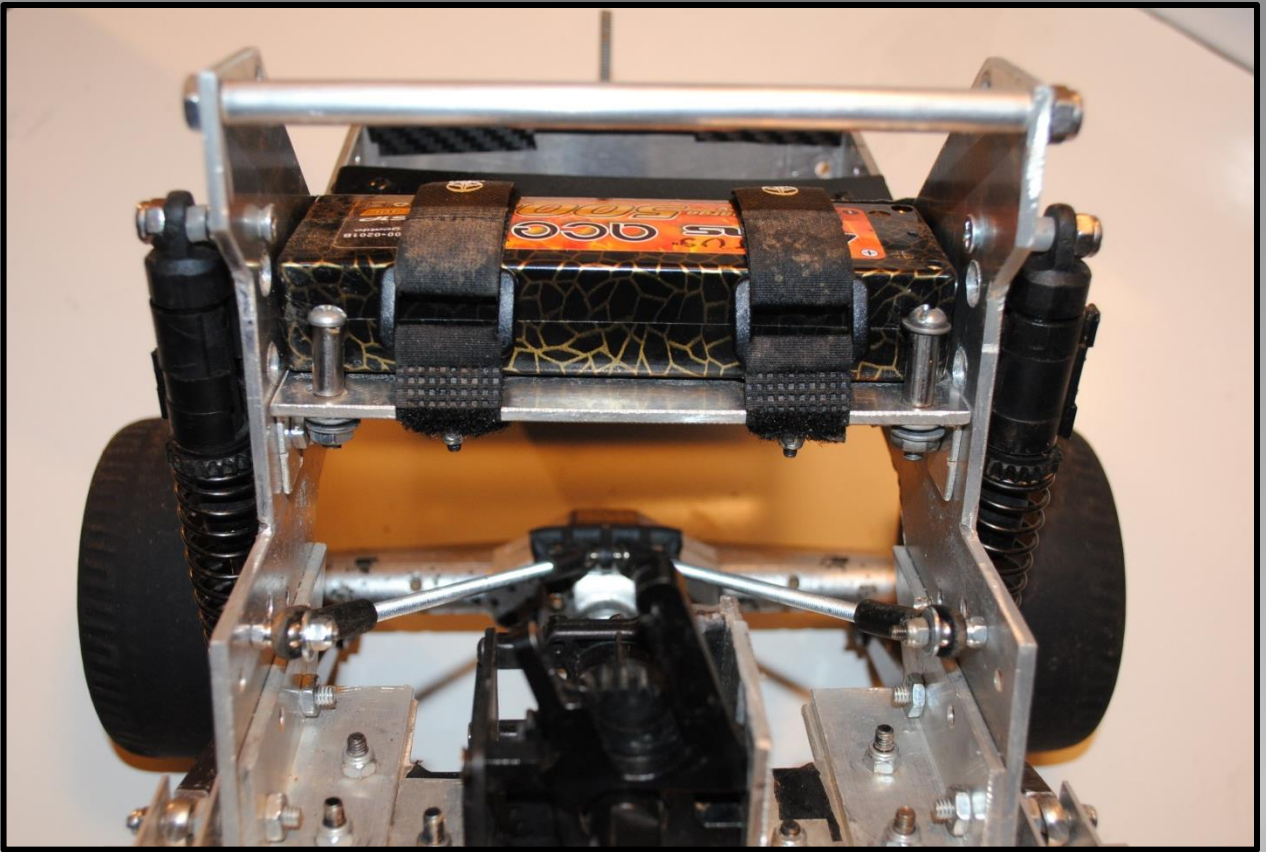


Step 6: Battery Placement

I tested out a couple different spots for the battery



Step 6: Battery Placement



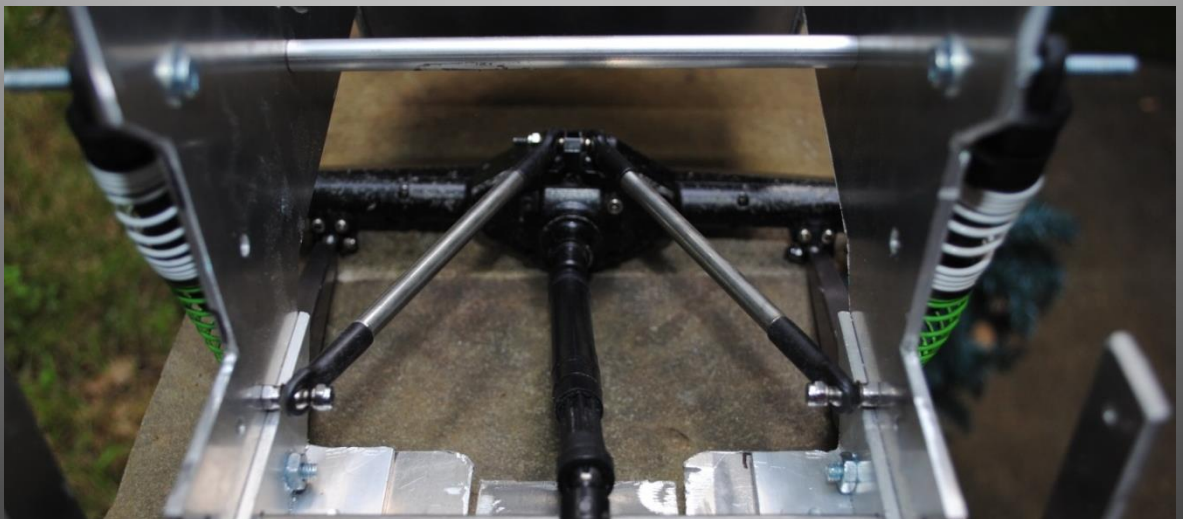
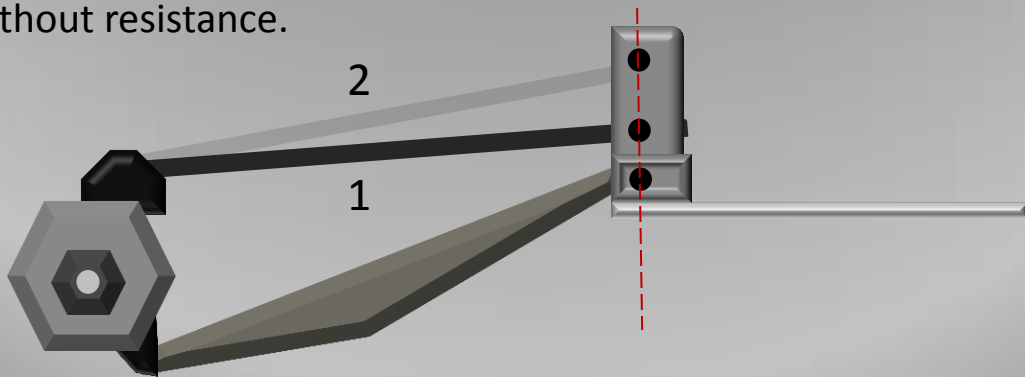
Here's my final spot. I took a hit on the COG for easy battery access.



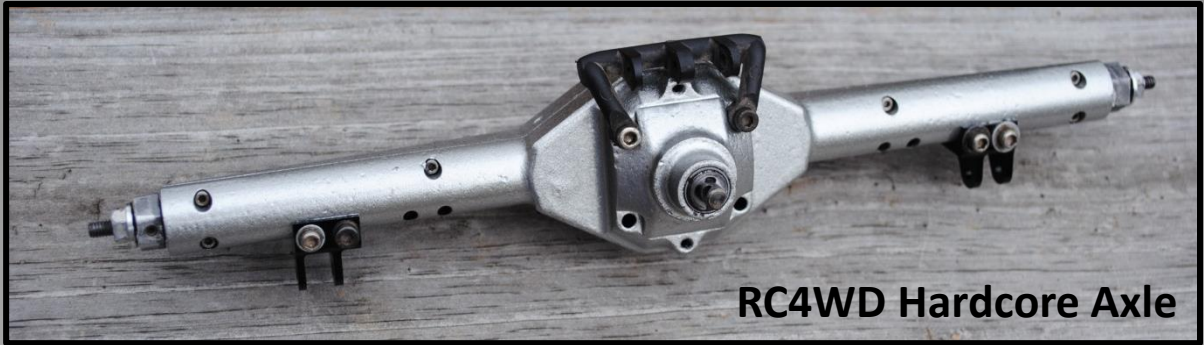
Step 4: 4-Link Solid Axle

Here is what makes these trucks so special, the 4 link rear end. The purpose of this unique suspension is to offer the most travel and articulation possible. Unlike rear a-arms, a solid axle connects both the rear drive wheels to offer unreal amounts of traction. This traction can only be harnessed if the 4 link geometry is correct. You want the top links to be in line with the trailing arm mount on the chassis. With that, you also have the tuning option to raise the location of that mount. I've found that with higher top links you get better traction (2) .

If both the top links are the same length and are secured correctly, there should be no slack and your axle should swing up and down without resistance.

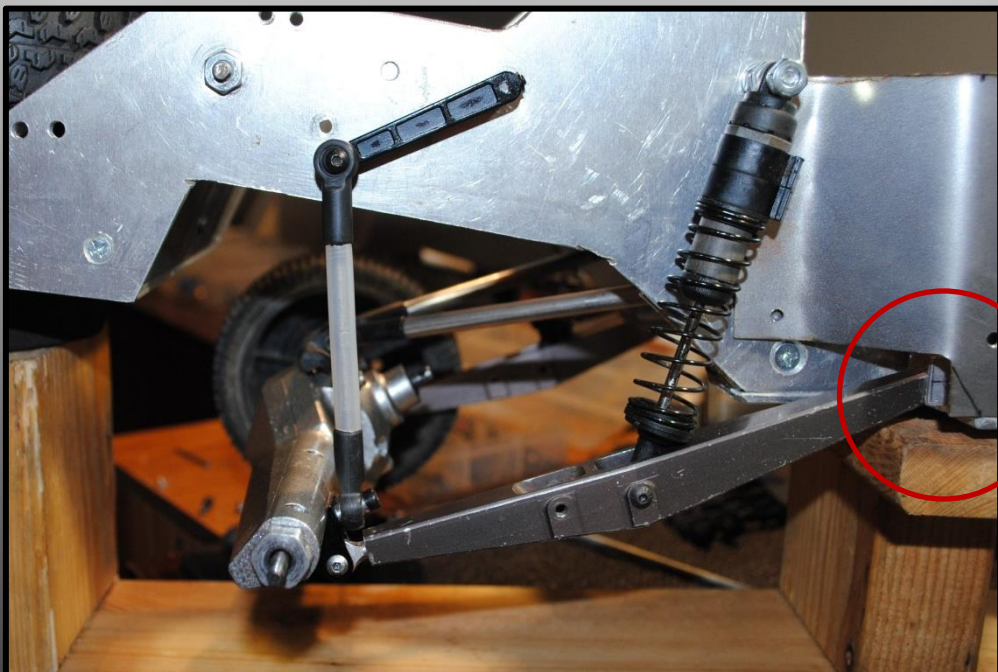
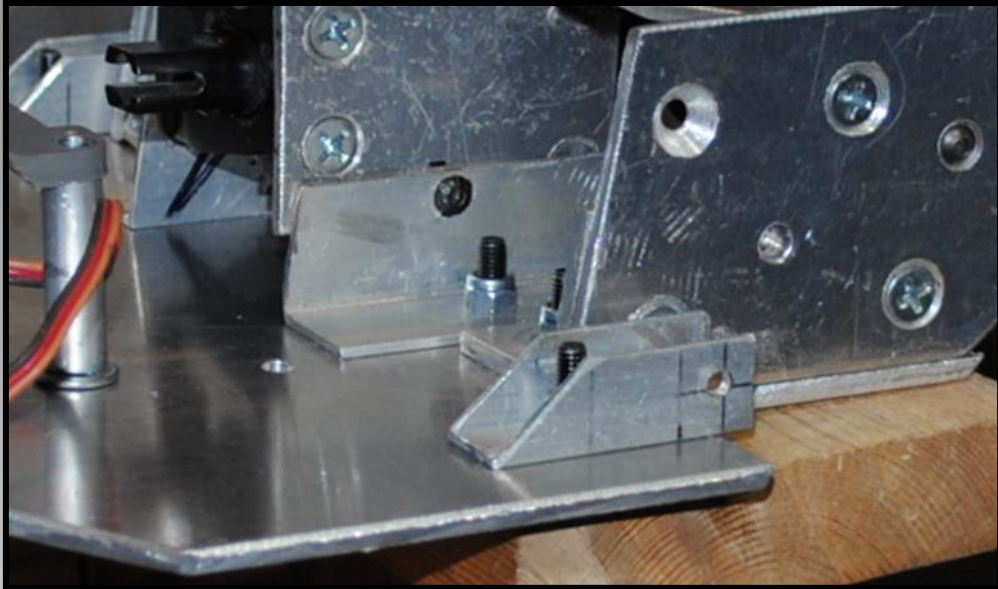


Step 4: 4-Link Solid Axle

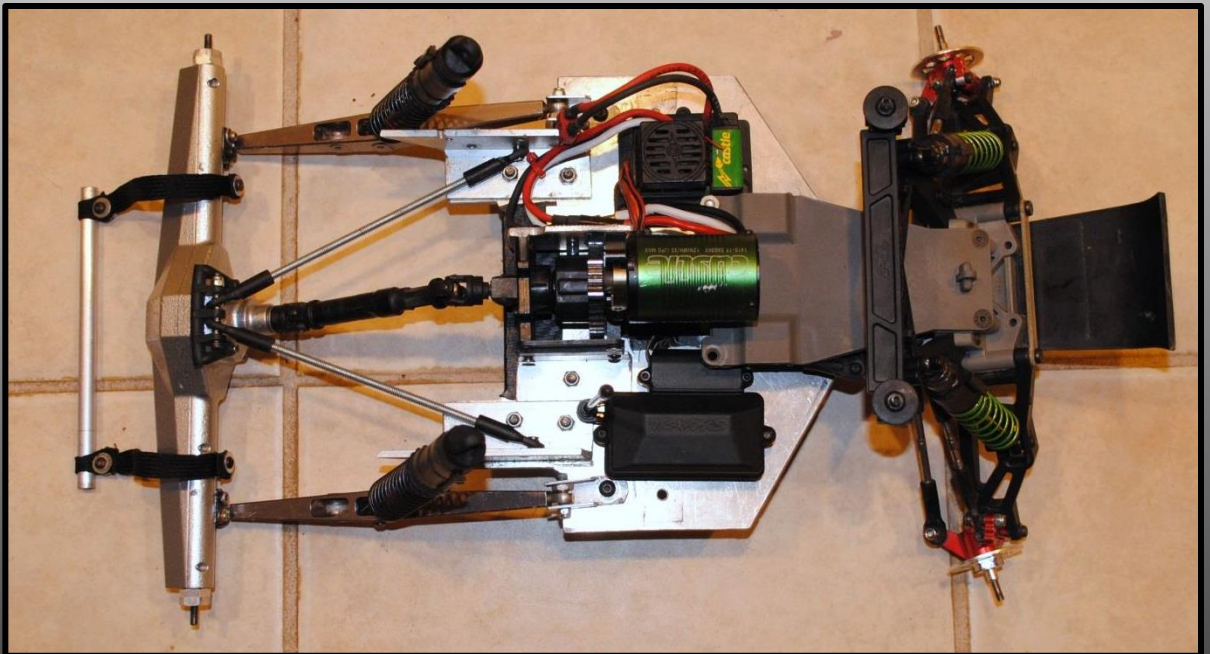
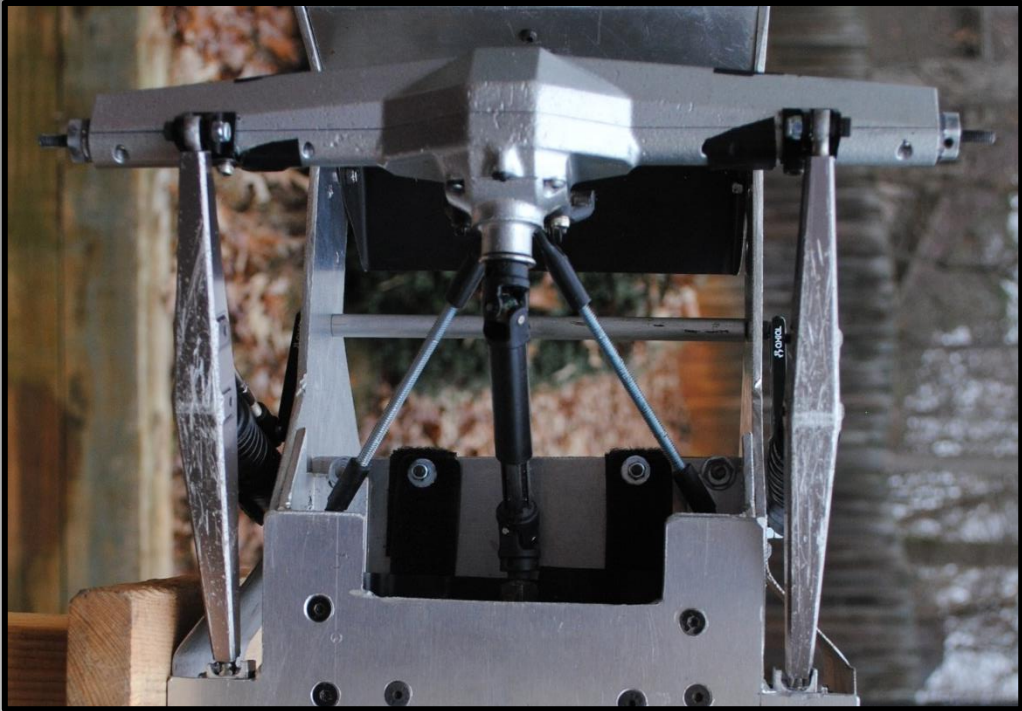


Step 4: 4-Link Solid Axle

I used 1/2 in. aluminum u-channels to attach the trailing arms to the chassis. For it to be snug, you have to put washers next to the rod-end so it doesn't move around. You can try 1/4 in. for it to fit better, but you'll have to use smaller mounting screws for the chassis.

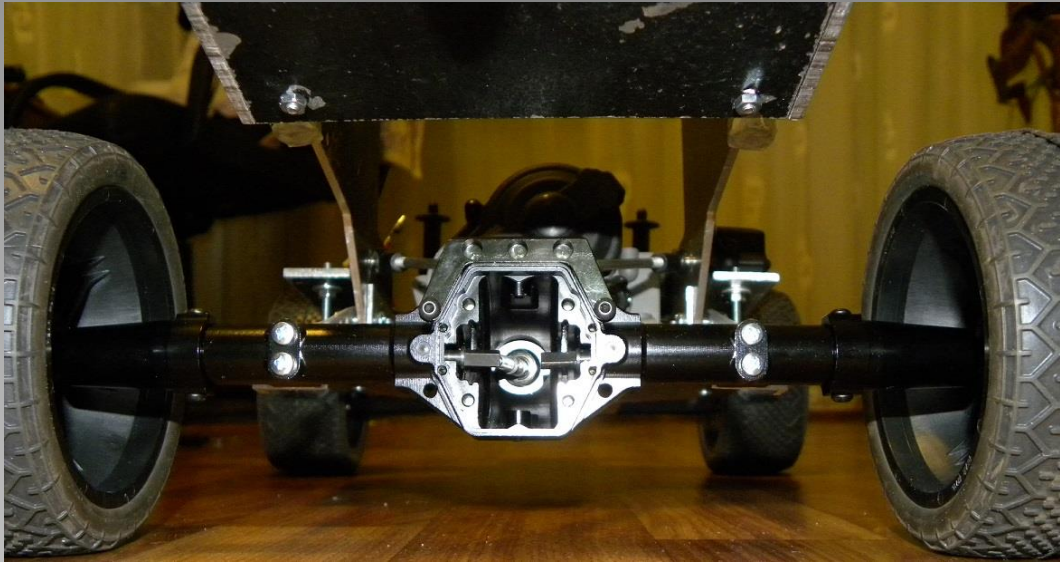


Step 4: 4-Link Solid Axle



Step 4: 4-Link Solid Axle

It's sad to say, but your rear end won't be able to look like mine. The parts I used (hardcore axle and trailing arms) are no longer produced by RC4WD, but there are alternatives!



The RC4WD wraith axle would have been my back up if I didn't get the hardcore. If you get the housing you'll also have to buy the Axial internal gears and the other parts separate.

If you can find any of these used you'll be saving a bunch a money.

- Wraith Centered Axle Housing http://store.rc4wd.com/Aluminum-Rear...k-p_2495.html
- Trailing Arm Mounts <http://www.amainhobbies.com/product...nt-Set-Black-2>
- Diff Parts <http://www.amainhobbies.com/product...ocked-Axle-Set>
- Axle Lockouts <http://www.amainhobbies.com/product...r-Axle-Lockout>

The Breakdown

I used all the options in red

1) Motor mount

- Option (A) SCTE setup
- Option (B) Slash 2wd Transmission with diff locker

2) Trailing Arms

- Option (A) RC4WD Hardcore
- Option (B) Twin Hammers Trailing Arms – These are a little shorter
http://www.rpphobby.com/product_p/vps06906.htm
- Option (C) Custom Made – My brother's pictured below

3) Rear Shocks

- Option (A) HPI E-Savage shocks (longest)
- Option (B) Axial Scorpion Shocks
- Option (C) Traxxas XL Big Bores
- Option (D) Pro-Line Powerstrokes

4) Solid Axle

- Option (A) RC4WD Hardcore Axle
- Option (B) RC4WD Wraith Axle
- Option (C) HPI Wheely King Axle

5) Driveshaft

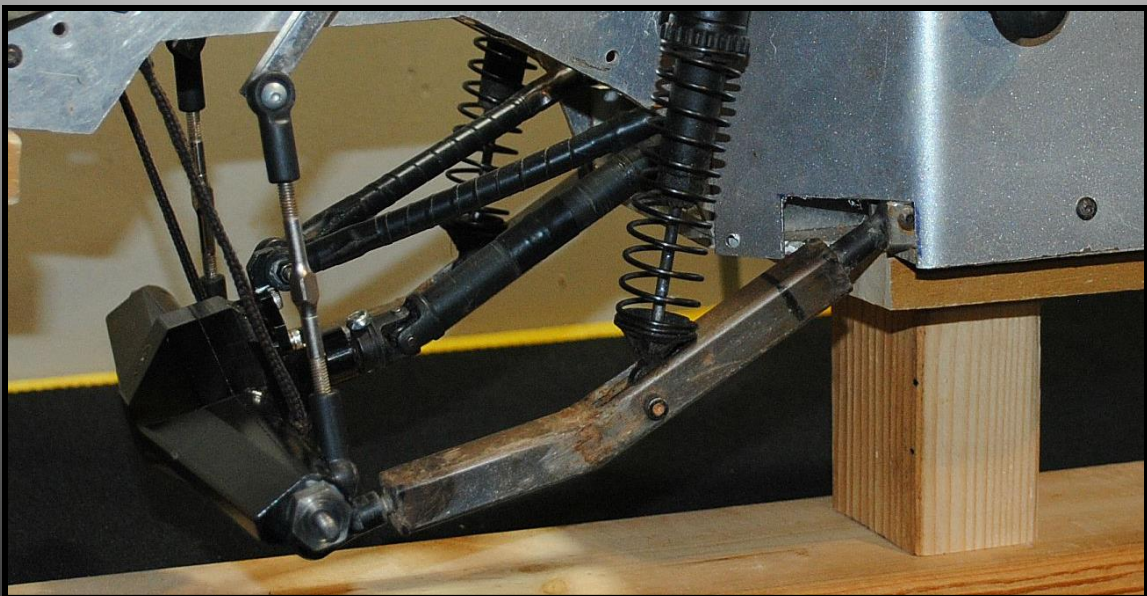
- Option (A) Traxxas Slash 4x4 Heavy Duty drives hafts
- Option (B) Axial SCX10 drive shafts
- Option (B) MIP X-Duty

6) Top Links

- Option (A) Custom Made

7) Sway Bars

- Option (A) Axial Wraith Front sway bars
- Option (B) Custom made





Now it's time to get it dirty!

