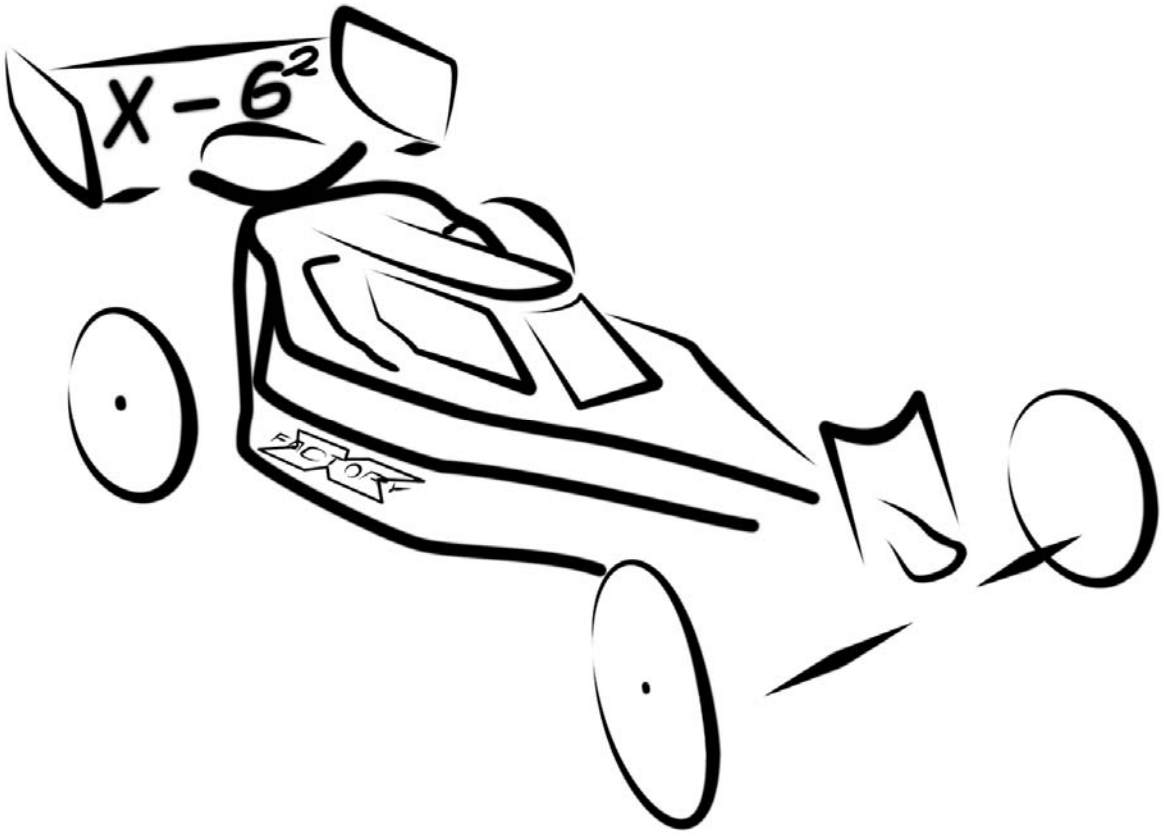
X – 6 SQUARED

K 021 KIT

INSTRUCTION MANUAL

Version 1.0



X – 6 SQUARED KIT

CONTENTS

X – 6 SQUARED ASSEMBLY INSTRUCTIONS

FIRST THINGS FIRST

A) ASSUMPTIONS These instructions assume several things:

1. You have at least some experience building R/C cars. These instructions are not written for a first-timer.
2. You have the usual assortment of R/C tools.

If you do not meet both assumptions above, please contact us. Contact information is on Page 4.

B) We suggest you have a clean, well-lighted work area.

C) Before threading screws or ball studs into plastic parts, tap the hole with a 4-40 tap.

D) All references to right and left are from the viewpoint of the driver sitting in the car facing forward.

E) This Kit contains many parts; most are supplied by X Factory, others are genuine Team Associated parts. A complete parts list is at the end of this manual.

F) Many AE parts are supplied on “trees.” When you remove those parts from the trees, we suggest you do so with a twisting motion to reduce flashing on the parts, then dress the parts with a file prior to assembly.

G) To photograph this manual, we assembled the car several times. In some photos, parts you have already assembled are “missing.” This was done deliberately so you may clearly see this particular step. Follow the steps in order and you’ll get to the end quickly.

SOME IMPORTANT INFORMATION

This is the first time we have made the entire Kit – always before we have made Conversion Kits. We know we are not perfect. If you experience the slightest difficulty assembling your X – 6 Squared – if you have trouble with an instruction or if something does not fit properly – please contact us immediately. Even if you figure out what needs to be done or modify the part to fit, we will make changes to help the next person.

Here at X Factory we do not have customers. You have become a member of a world-wide Family of R/C racing enthusiasts who love working on their cars, trying new things, helping each other at the track, and winning races. The Family constantly gives us ideas for new products or improvements to existing products. We welcome and encourage this input. Thanks in advance for your help!

E-mail chazz@4wdrc.com
Phone +01 1-419-877-1787
(U.S.A.)

Snail mail
X Factory R/C Racing Products
P.O. Box 2361
Whitehouse, Ohio 43571 U.S.A.

These instructions are available on our Web site, www.xfactoryrc.com in the Tech section. Many of the color photos on the web are better than the black and white versions here. You are welcome to download all or any part of the website manual.

THANK YOU FOR YOUR
CONFIDENCE IN
THE NEW MATH!

Chief Engineer and designer
Of the X – 6 Squared
Paul Sinclair (large arrow)
His X – 6 Squared (small arrow)

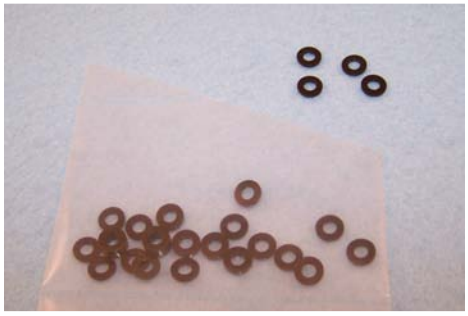
**WELCOME TO THE
X FACTORY FAMILY!!**

BAG A

FRONT ARMS AND HUBS

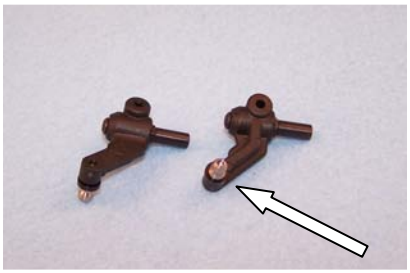
CASTER BLOCKS

A1) Remove the steering blocks (ASC 9581), two front axles (2601), two 1/4" button head screws (6041), and two 1/4" ball studs (6171) from Bag A. Also pull out the bag of black Dirtz Dialed Partz shims (5701). There are enough shims in this bag to do the entire car, so take out four .030" shims (the small ones) now and save the rest in the bag. These shims will be used throughout the build.

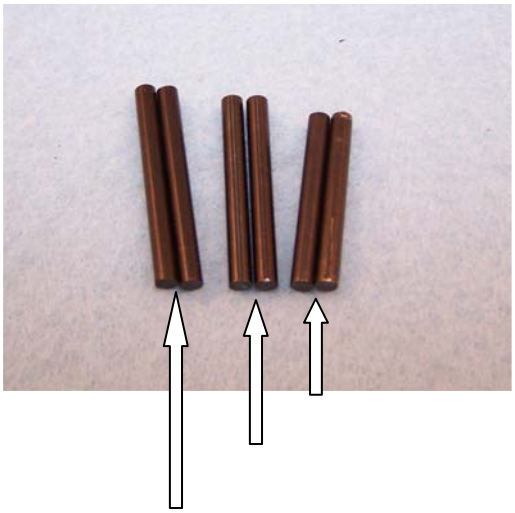


A2) Put the smaller diameter end of one axle into a steering block from the outside, lining up the axle's hex with the hex in the block. Push the axle in until it seats fully, then secure from the inside with a 1/4" button head screw. You may want to put the smallest drop of thread lock on this screw. Repeat for the other steering block and axle.

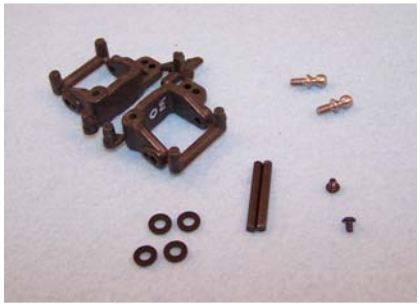
A3) Check the set-up sheet and Tuning Section to determine how many Dirtz Dialed Partz .030" shims to use for the tie-rod ball studs. These shims adjust bump steer. Here we are using two. Slide the same number of shim(s) onto the threaded ends of each ball stud, and install the ball studs into the top of the steering blocks. The top is the side with the re-enforcing rib. The bottom has the letter denoting which side this block fits.

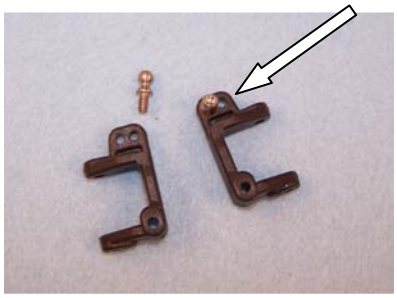


A4) Remove the bag with six hinge pins (ASC 9622) from Bag A. The bag has three pair of pins: long (rear outer), middle (front outer), and short (front king pins). The (short) king pins will be used now, the (middle) front outer pins will be used later in Bag A, and you must save the (long) rear outer pins for Bag G. You'll be using more Dirtz Dialed Partz shims in Bag G, so you might want to put the long pins in there for now.

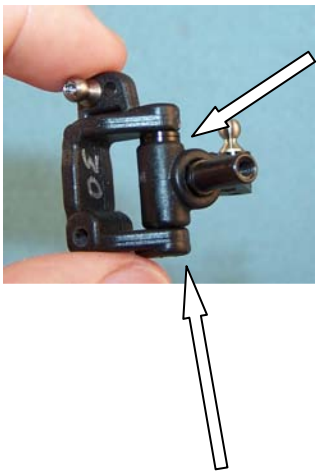


A5) Remove the 30° caster blocks (ASC 9593), two king pins (the shortest ones), two 2-56 X 1/8" button head screws (6053), two 3/16" ball studs (6170), and four Dirtz Dialed Partz .030" shims from Bag A. Check the set-up sheet and Tuning Section to determine which hole to use for your ball stud. Here we have used the A hole (inside) for the ball stud. When on the car, the ball stud land is to the rear of the caster block. Install a 3/16" ball stud from the front in each caster block.





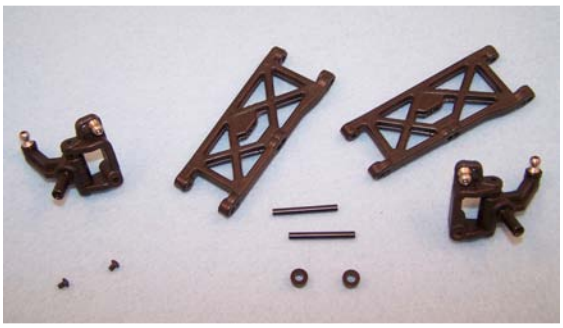
A6) Check the set-up sheet and Tuning Section to determine where you will shim your steering blocks. Here the steering block is in the lowest position with both shims at the top. Put the left steering block into the left caster block and slide the king pin up from the bottom. As the pin emerges from the top of the steering block, add two Dirtz Dialed Partz .030" shims, then slide the pin the rest of the way into the top of the caster block.

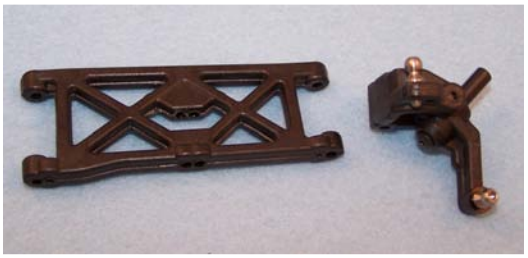


A7) Secure the king pin with the 2-56 X 1/8" screw. You've got to push on these screws to get them to thread in, once the head of the screw contacts the king pin, stop tightening. Do not be a gorilla here because these little screws strip easily and they are just there to hold in the pin.

FRONT ARM ASSEMBLY

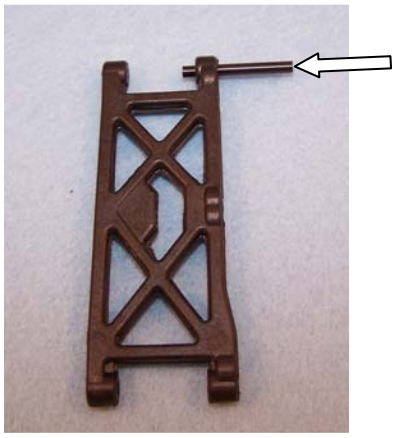
A8) Now remove from Bag A the two front control arms (ASC 9578), two outer hinge pins, and two 2-56 X 1/8" button head screws. From the shim bag, remove the two Dirtz Dialed Partz .140" shims (the big ones). The holes for mounting the shocks are at the rear of the control arms. Gather together a front control arm and the right caster block assembly.

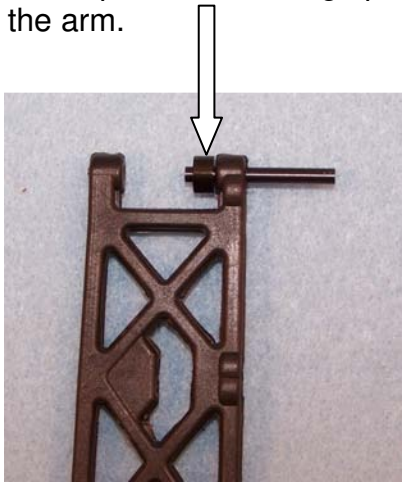


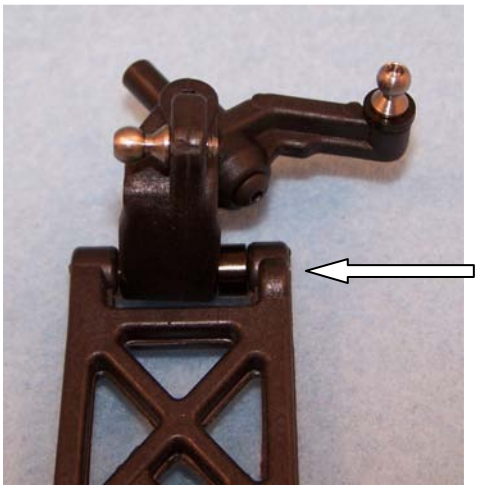


A9) The hinge pin hole in 30° caster blocks is notoriously tight. Team drivers have a 7/64" ream in their tool box and use it here. Start the hinge pin into the arm from the rear. The shock mounting holes are to the rear of the arm. Consult the set-up sheet and Tuning Section to determine where you will shim the caster block. Here we show the block forward, so the shim is to the rear. As the hinge pin emerges from the rear part of the

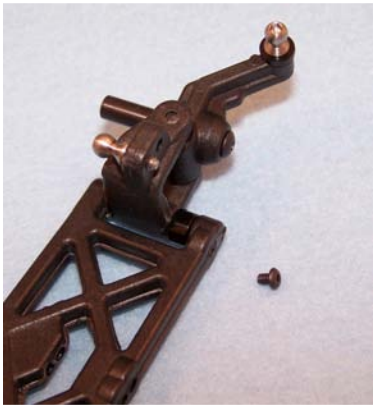
arm, put the shim on and push the pin through the shim. Now add the caster block assembly, keeping the steering block ball stud to the rear and the caster block ball stud up. Slide the hinge pin all the way through and into the front part of the arm.

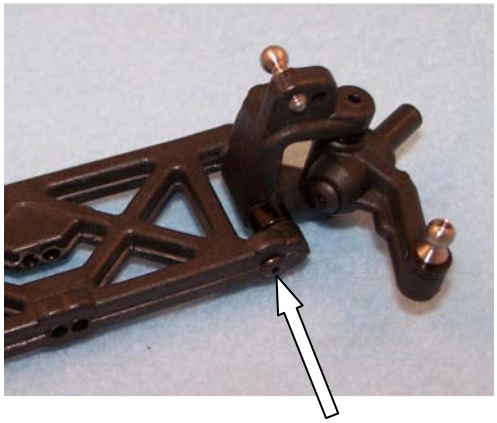






A10) Time for another one of those little screws. Install a 2-56 X 1/8 button head screw from the rear of the arm to hold the hinge pin in. Watch out for the gorilla!

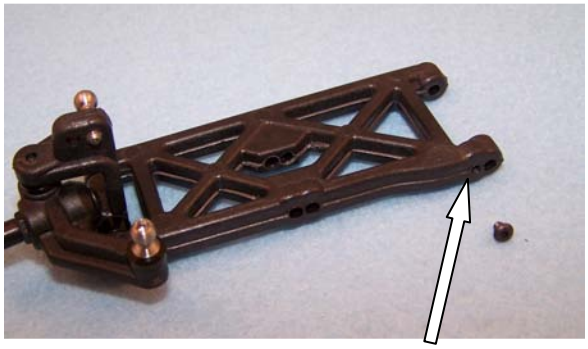




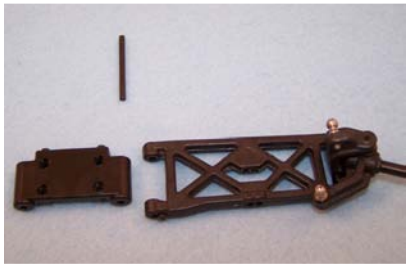
A11) Repeat for the left side.

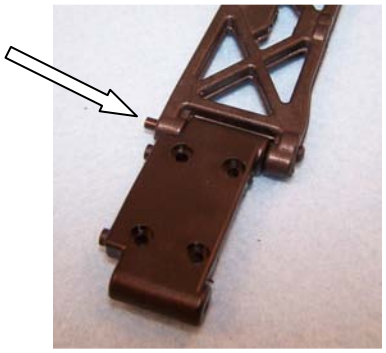
BULKHEAD ASSEMBLY

A12) Install another one of those 2-56 X 1/8" button head screws into the rear of each control arm where the inner hinge pin goes. Yes, do this now. Just snug the screw down to the arm.



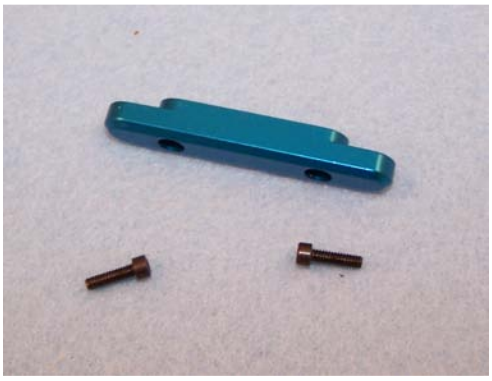
A13) Remove the bulkhead (ASC 9563) and bag with two inner hinge pins from Bag A. Place the bulkhead right side up on the bench. The "flat" side with the recessed holes is the top. Place the right arm on the right side of the bulkhead and slide the hinge pin through the front of the arm, the bulkhead, and into the back of the arm until the pin just touches the little button head screw. Don't push the little screw out! The pin will protrude from the front of the arm.

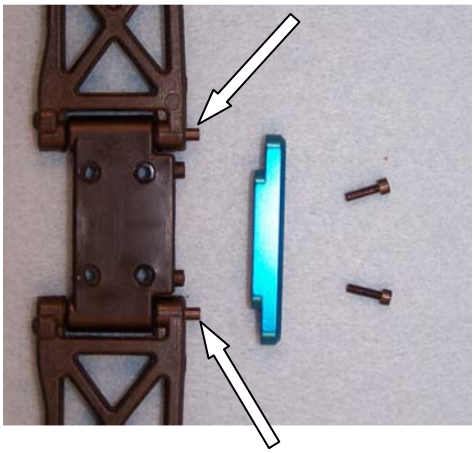


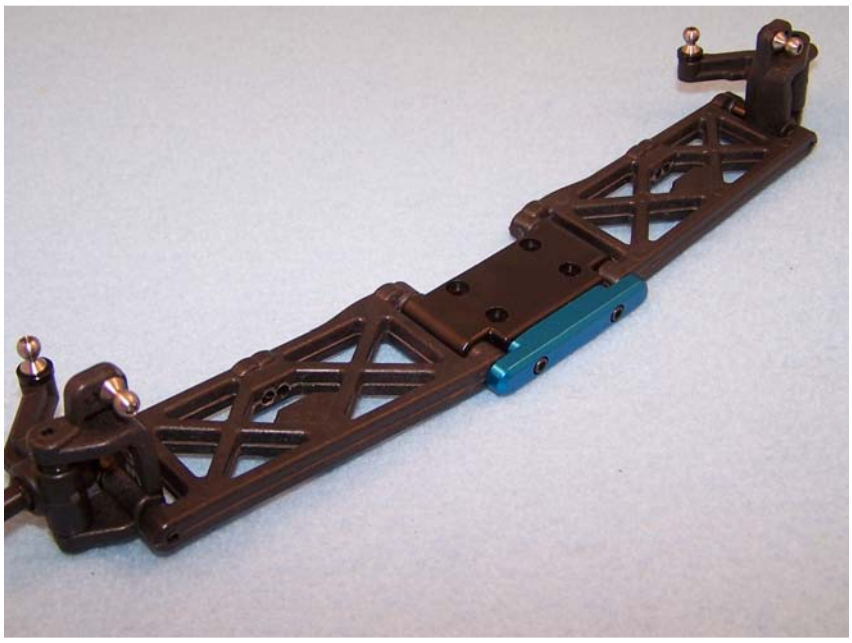


A14) Repeat for the left arm.

A15) Remove the blue hinge pin brace (ASC 9665) and two 2-56 X 5/16" cap head screws (6055) from bag A. Place the outer holes of the brace over the two hinge pins (arrows); the brace's inner holes go over the bosses in the bulkhead. Secure the brace with the two screws through the inner holes. Gorilla warning! He's banging on his cage and wants to get out! Over-tightening may bind up the control arms or strip the little threads. Team tip: File away any flashing on the parting line of the control arms where the front brace goes to prevent binding.







The bulkhead-control arm assembly is complete.
Set this assembly aside until step B13.

BAG B

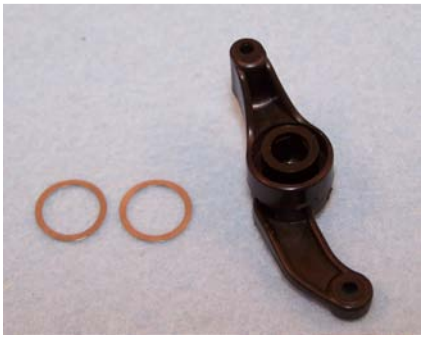
COMPLETE THE FRONT END

SERVO SAVER

B1) Before proceeding with Bag B, please note: AE instructions tell us to put grease on the joint between the servo saver bellcranks. Many X Factory Team drivers do not. The problem with the AE servo saver is too much movement, not too little. In fact, many Team drivers CA glue the two bellcranks together. This increases the risk of either damage to the servo, breaking the bellcranks, or breaking the servo horn, but you'll get a much more direct feel to the steering. Some drivers complain their car is pushing when the real problem is movement in the servo saver assembly.

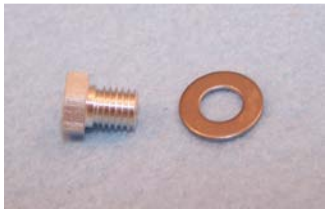
B2) Remove the bag of plastic steering parts (ASC 9659) and the bag of servo saver hardware (ASC 9610) from Bag B. Based on the above, put a bit of grease on the lower servo saver bellcrank where it rides against the upper bellcrank. (center photo) Or not. Put the two parts together. (right photo)

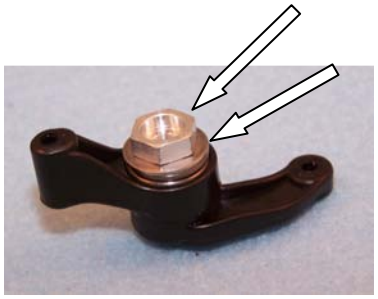
B3) Place the two thin shims in the upper servo saver bellcrank as shown in the right photo.



B4) Now put the spring over the shims.

B5) Place the large washer over the metal servo saver bolt. Screw the servo saver bolt down into the servo saver assembly. Be careful so the washer and bolt assembly fits properly over the spring. The hex on the bolt is 9mm, although a 3/8" wrench will get the job done. Don't be a gorilla here -- it's easy to strip the threads out of the lower bellcrank. You want the bolt snug on the bellcrank, but not overtightened. More tension on the bolt does "tighten" the saver, once it touches the saver that's it.

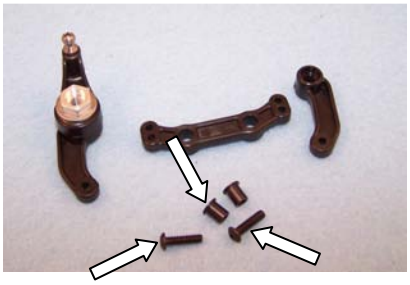


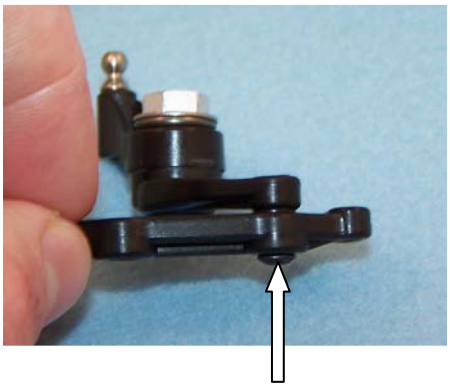


B6) Install a 3/16" ball stud (6170) in the end of the upper servo saver bellcrank.

STEERING ASSEMBLY

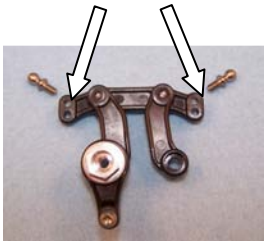
B7) Now use the little bag with 2 screws and 2 bushings. You will also need the steering rack and servo saver assembly. (left top) Insert a bushing into the left side of the steering rack as shown in the right top photo. The bushing goes down from the top and will fit between the two plastic pieces. (right top) Line up the servo saver assembly on top of the bushing and secure with a 7/16 buttonhead screw from the bag by putting the screw up from the bottom. (Right bottom)



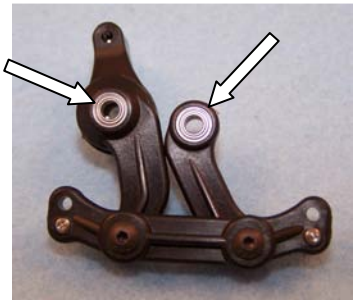


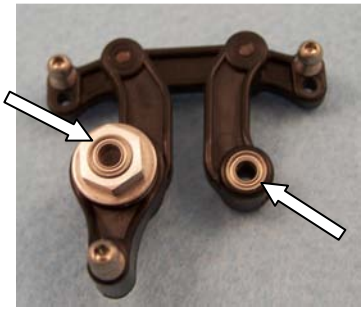
B8) Repeat the procedure with the remaining bushing and 7/16” screw to attach the right bellcrank to the steering rack.

B9) Put a 3/16” ball stud (6170) in the front hole on each side of the steering rack. The rear hole is used for inline axles.

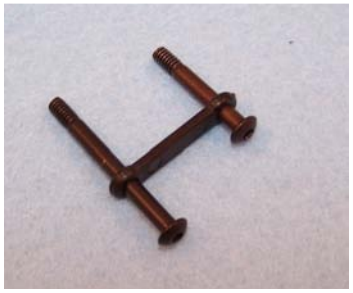


B10) Install a 1/8” X 1/4” bearing (6205) in the recess on the bottom of the two bellcranks. Place a third bearing in the recess on top of the right bellcrank, and the fourth bearing in the recess on top of the servo saver bolt. Watch out, because the bearing in the saver bolt likes to fall out.

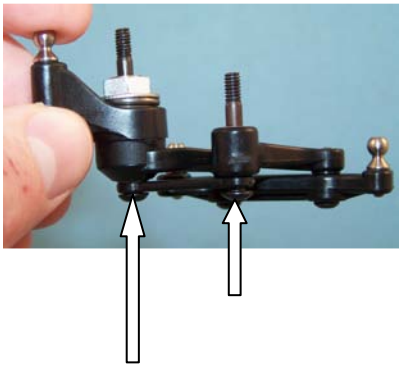


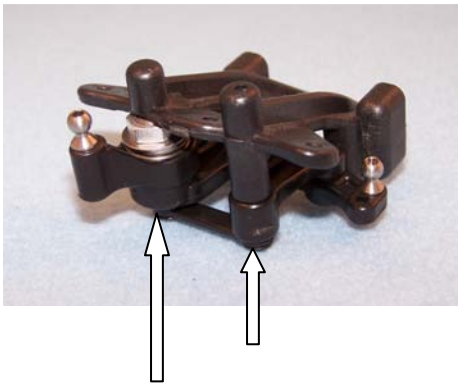


B11) Put the two steering bolts (ASC 9640) in the same direction through the steering brace.



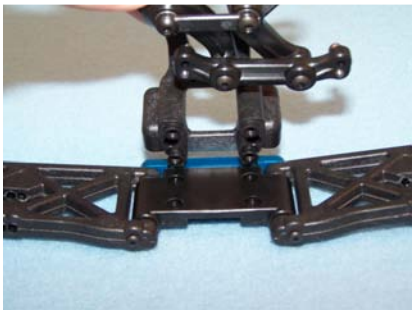
B12) Now put the steering bolts up from the bottom through the right bellcrank (short bolt) and the servo saver (long bolt). The brace remains on the bottom. Bolt the steering assembly to the underside of the top plate (ASC 9566). Be certain all four bearings remain in place. Snug these bolts down so they won't come loose, but do not over tighten to bind up the steering. Keep the gorilla in his cage.

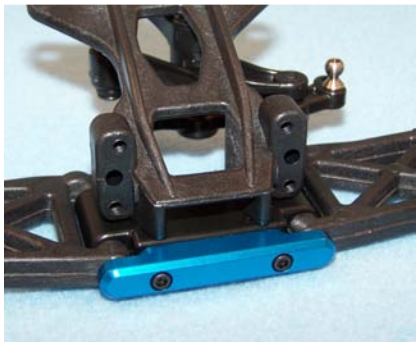




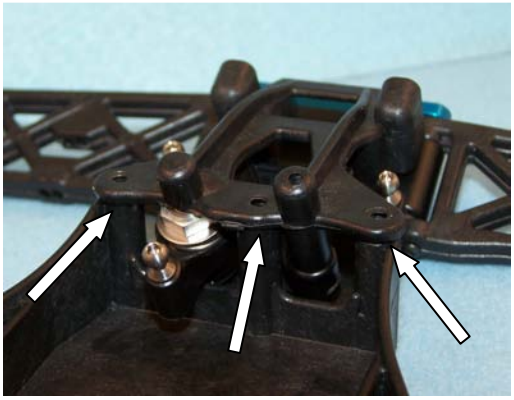
FINISH THE FRONT END

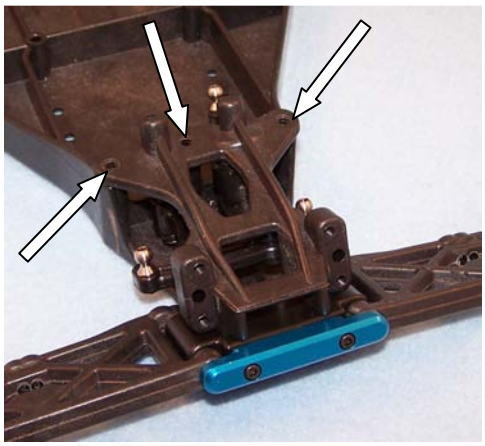
B13) Find your bulkhead assembly from Bag A and line up the bosses underneath the front of the top plate with the recesses in the bulkhead. Be sure the bulkhead and top plate are both facing forward, as in the photos, and press the top plate into the bulkhead. The top plate must seat well into the bulkhead.



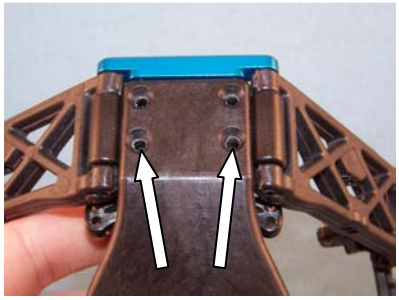


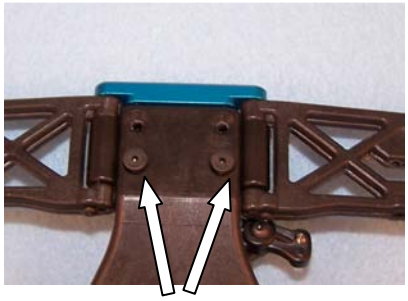
B14) Position the bulkhead and top plate assembly on the front of the chassis (1006). Be certain the three rear holes on the top plate fit down properly over the three posts near the front of the chassis.



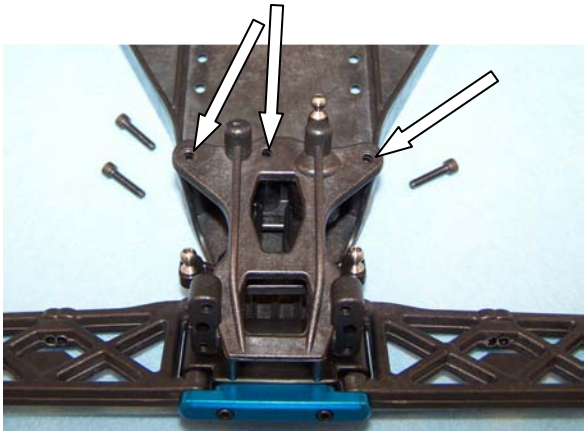


B15) Secure the bulkhead with two 5/8" flat head screws (6024) from under the chassis through the two rear holes in the nose. Leave these screws finger tight until inst. B16 below.

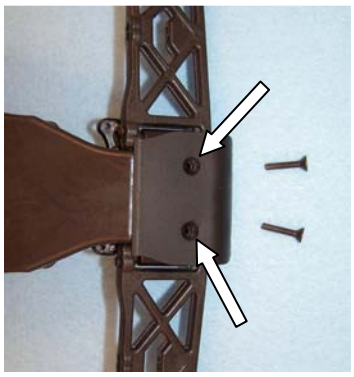




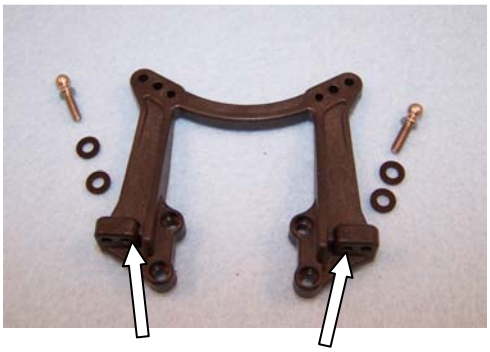
B16) Using the three 1/2" cap head screws (6002), secure the rear of the top plate to the chassis. Be sure you pre-tap the chassis with a 4-40 tap. Now tighten the two screws below the chassis from inst B15 above.

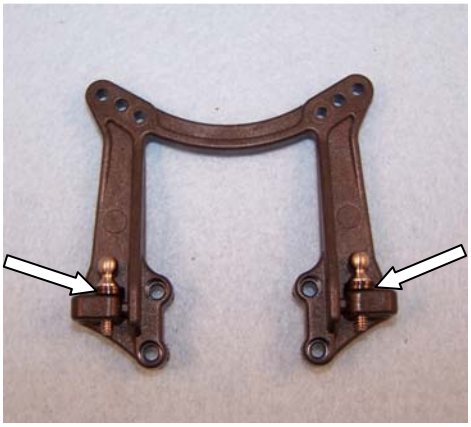


B17) Position the bumper (ASC 9562) under the chassis so it covers the two screws from B12 above and is over the two forward holes in the chassis. Install the bumper with two 5/8" flat head screws.



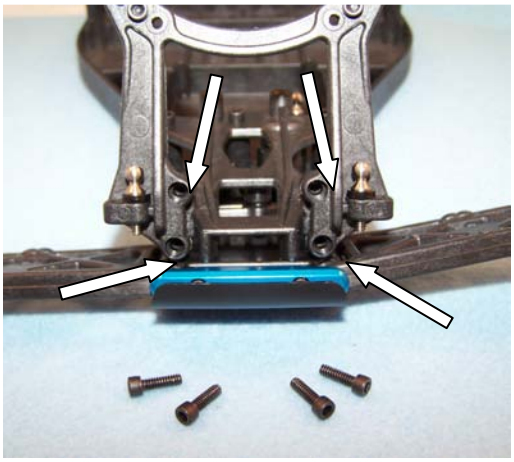
B18) Consult the set-up sheet and Tuning Section to determine how many .030" Dirtz Dialed Partz shims you will use under your inner ball stud, and which hole the stud will go in. Place the shim(s) if any under a 3/8" ball stud (6172) and install it down from the top into one side of the shock tower. Photos show two shims and the #1 (inside) hole. Repeat for the other side of the tower.





B19) Install two 4-40 X 3/4" cap head (6004) upper shock mounting bolts in the top of the tower. Consult the set-up sheet and Tuning Section to determine which hole you will use. These photos show the mounting bolt in the #2 (center) hole. Put the bolt in from the front of the tower and tighten a nut (6070) against the back of the tower.

B20) Install the shock tower onto the front of the top plate using four 3/8” cap head screws (6001). The heads of the screws fit into recesses in the front of the tower. These bolts should be snug; however, the gorilla, somehow loose now from his cage, regrets making them too tight when, on the ninth time he removes the tower, the holes are stripped.

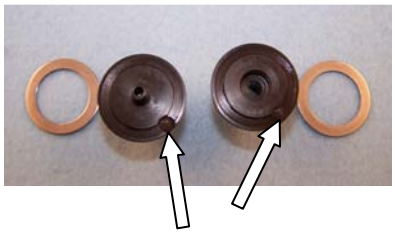


That’s it -- Front end is done!

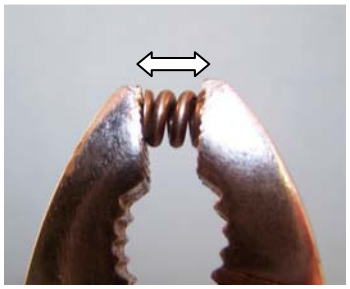
BAG C

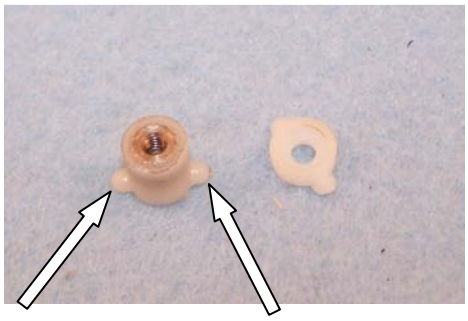
DIFFERENTIAL

C1) Remove the diff rings (ASC7677) and outdrives (ASC 7667 & 7668) from Bag C. Place a small amount of diff lube on each outdrive as shown by the arrows. The only purpose of this is to hold the rings on the outdrives during assembly. Then put one ring on each outdrive. Wipe off excess lube. Set the female outdrive aside for now. (Diff lube not included.)

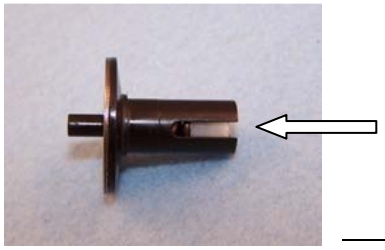


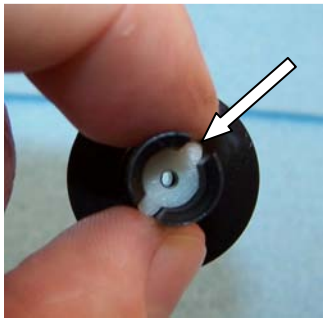
C2) Remove the diff spring (ASC7677) from Bag C and compress it fully with a pliers to “break in” the spring. Now take the white tree (ASC7677) from Bag C and remove the locking T-nut. Carefully trim any flashing, but do not remove the two “ears” which hold the T-nut in the outdrive. (arrows)



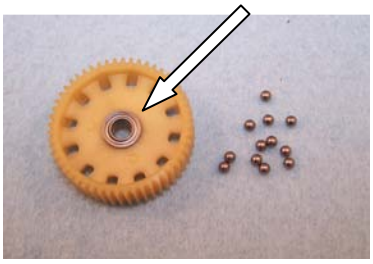


C3) Place the spring into the male outdrive as shown, then the T-nut, with the T-nut “ears” to the outside. (arrows) Set the male outdrive aside for now.

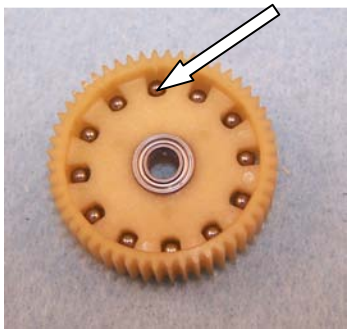




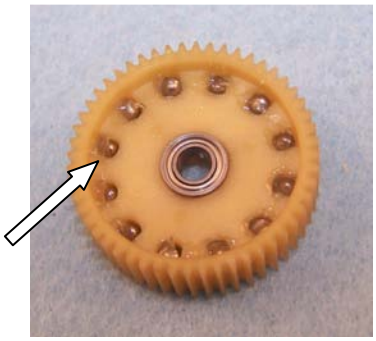
C4) Remove the diff gear (ASC 7664), one diff bearing (6204), and the diff ball packet (6500) from Bag C. Press the bearing firmly into the center of the diff gear.



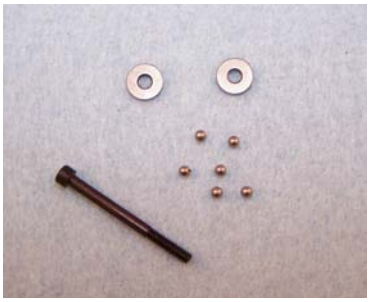
5) Remove the balls from the packet and put them in a handy spot on your bench. Keep them clean! Now push one diff ball into each of the 12 holes in the diff gear.

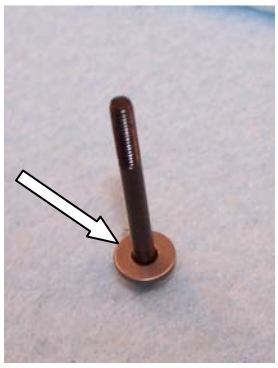


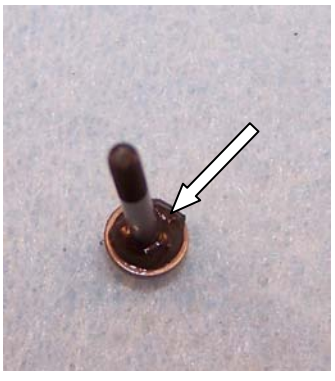
C6) Put a thin bead of diff lube (clear) around the diff gear on top of the balls. Do this to each side. Use the lube carefully, coating each ball. You don't need much, and the excess attracts dirt. The gear itself never contacts the rings or the outdrives, so you only need enough for the balls.



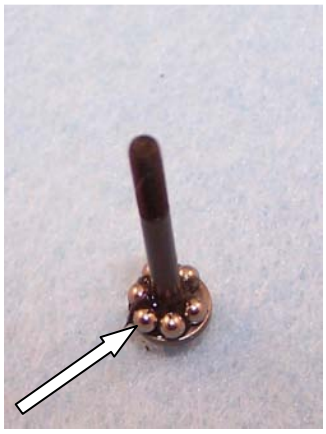
C7) Remove from Bag C the diff thrust bolt (ASC 7677), two small thrust washers (ASC 7677), and the bag of thrust balls (ASC 7677). These balls are smaller than the diff balls, and there are just six of them. Slide one thrust washer over the screw all the way to the head of the screw. Remove the thrust balls from their bag and have them in a handy spot on your bench. Keep them clean! Now apply a bead of thrust lube to the washer on the screw as shown in the right photo. (Thrust lube not included.)



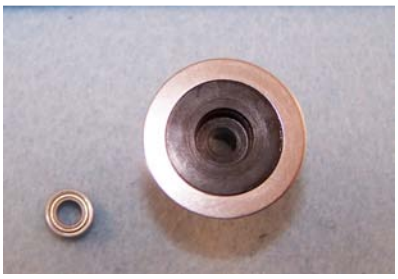


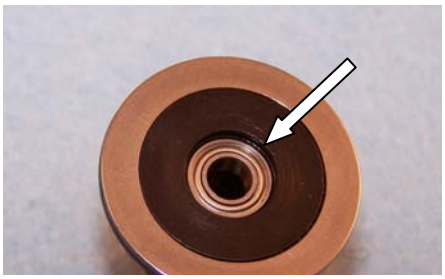


C8) Place the thrust balls one at a time in the lube on the washer. The lube will hold them there. All six balls will fit nicely on the washer. When all six balls are on, place the second thrust washer over the screw and slide it down over the balls. No extra lube should be required. The lube should hold the second washer there too. You want lots of lube in the thrust bearing, but you don't want it smeared all over the inside of the outdrive in C10 below. Carefully remove excess lube that protrudes beyond the washers. Stand the bolt on its head as in these photos and set it aside for a moment.

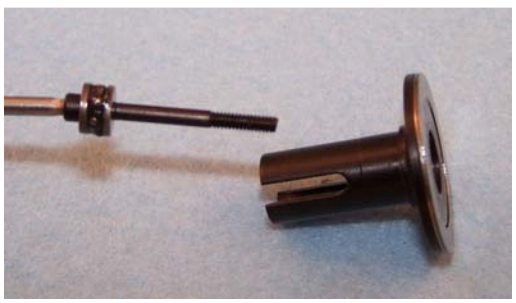


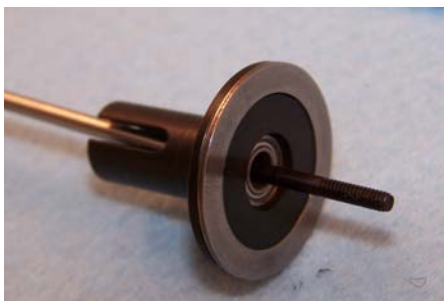
C9) Place the second diff bearing into the recess in the center of the female outdrive



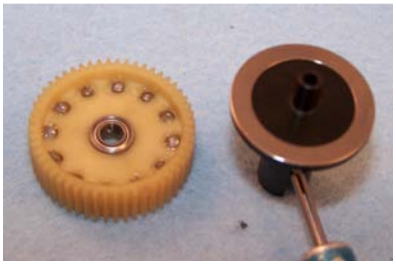


C10) Put the thrust bolt, with ball-and-washer assembly, onto a 5/64" wrench, and insert the bolt into the female outdrive as shown. Leave the wrench engaged in the bolt, and put the outdrive aside with its male friend. Make sure the thrust bolt and wrench do not fall out of the outdrive.

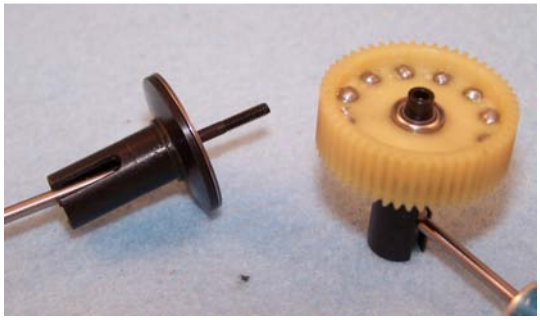


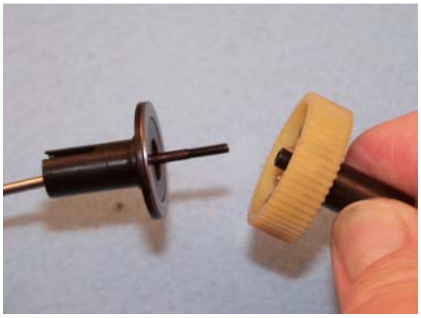


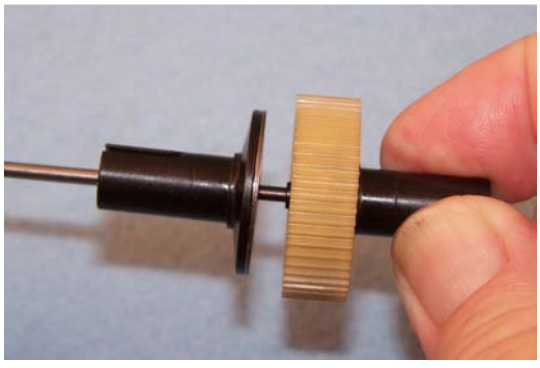
C11) Slide the diff gear, with bearing in the center, onto the male outdrive. The diff balls should contact the diff ring.

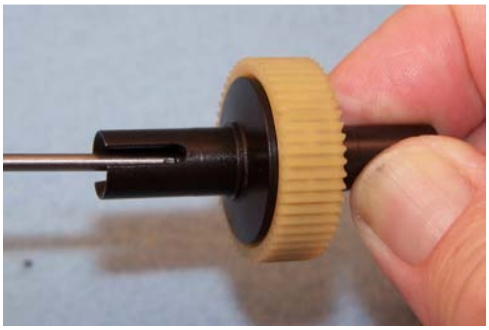


C12) Hold the male outdrive in one hand with your fingers over the two “ears” of the T-nut. With the other hand, pick up the wrench with female outdrive, keeping the wrench engaged in the thrust bolt. Slide the end of the bolt through the center of the bearing and into the male outdrive, engaging it into the T-nut. Screw the bolt a few turns into the T-nut, leaving things somewhat loose.

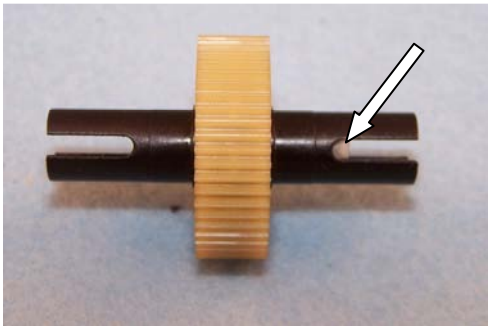




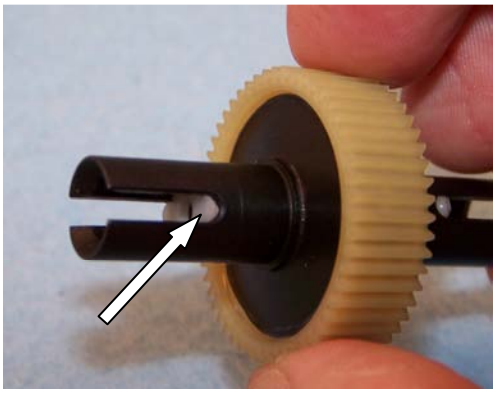




C13) Press in and rotate the outdrives against each other and the diff balls, then screw the thrust bolt a turn or two and rotate the outdrives again. Doing this helps seat the diff components as you tighten things down. Continue to screw in the thrust bolt and rotate the outdrives until the bolt is finger tight. Notice as you screw in the thrust bolt the T-nut (arrow) is moving deeper into the outdrive toward the center of the diff. This compresses the diff spring. When the T-nut reaches the bottom of the outdrive slots the spring is fully compressed. *Do not overtighten the thrust bolt!* The little 2-56 bolt breaks easily, or the "ears" will rip off the T-nut. Some gorilla drivers have actually put flat spots on the diff balls! Now back off the thrust bolt 1/8 turn and you've got a good starting point for diff adjustment.



C14) Carefully wipe any excess diff lube from between the outdrive and underside of the diff gear on both sides. Again, excess lube only attracts dirt. Last, remove the diff cover from the tree, trim it carefully – don't cut off the "ears"! – and push it in over the head of the thrust bolt concave side down to keep dirt out of the thrust bearing assembly.

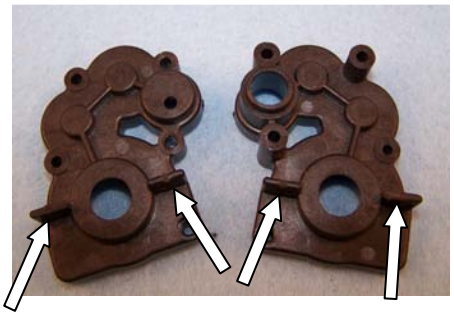


That's it, the diff is done. Took longer for us to write than for you to do!

BAG D

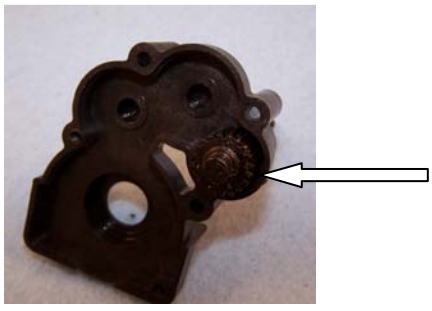
TRANSMISSION

D1) Remove the transmission case (5001) from Bag D and separate the two halves. Note the small round ejector pin bosses on the mounting tabs. You may wish to file these flat for later installation in the buggy.

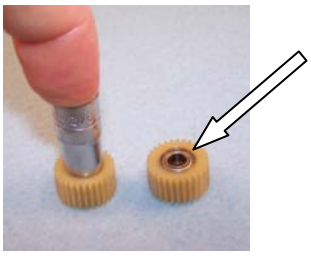


D2) Install a 3/16” X 3/8” rubber sealed bearing (6200) all the way into the top shaft boss in the left transmission half. The Team pushes bearings in with a hex driver or socket. See Inst. D4

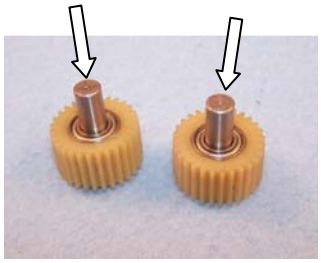
D3) Insert the top shaft (5210) through the bearing in the left transmission case half.

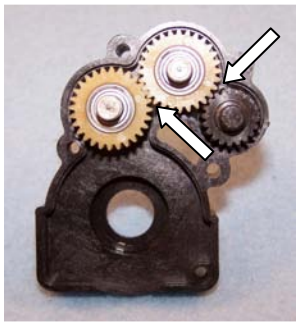


D4) Remove the two idler gears (ASC 9360) and four 3/16” X 3/8” metal shield bearings (6202) from Bag D. Install two bearings in each gear, one from each side. If a bearing is hard to install, we suggest pushing it with a socket or hex driver where the O.D. of the socket matches the diameter of the outer race of the bearing so you do not push on the balls or the inner race of the bearing. (right photo)

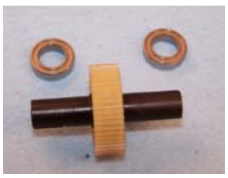


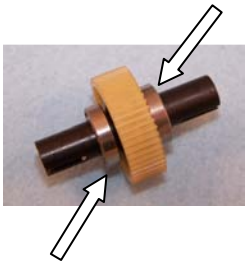
D5) Remove the two idler shafts (5201) from Bag D and slide them through the bearings on the idler gears. Then install the shafts with their gears into their bosses in the left transmission case half. Be certain to mesh all the gears properly.



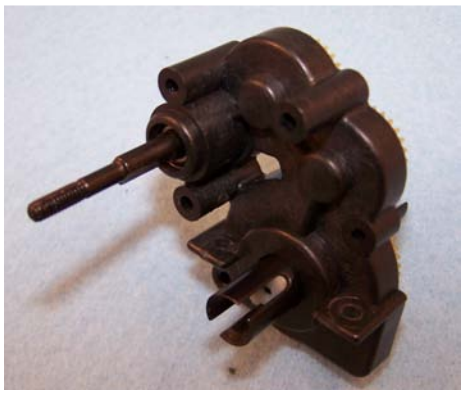


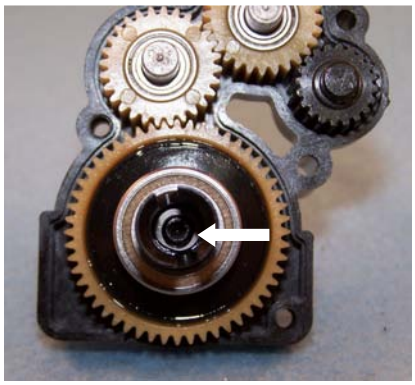
D6) Install a 3/8” X 5/8” rubber sealed bearing (6203) over both outdrives of the diff.

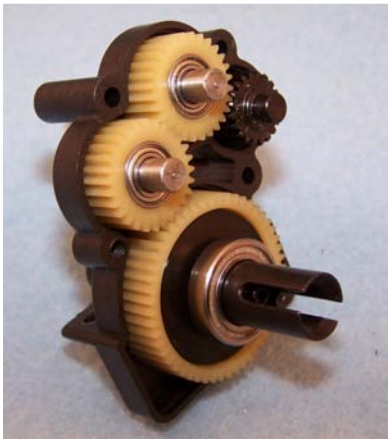


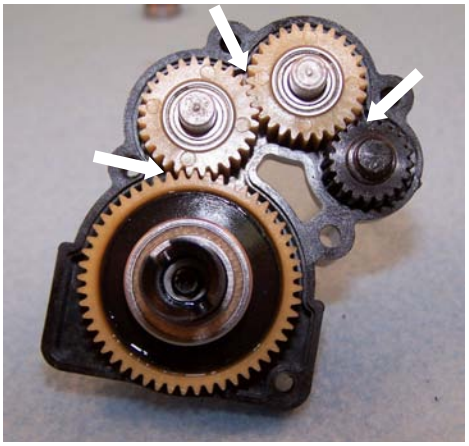


D7) Install the left side of the diff with bearing into the left trans case. The head of the diff screw should be up (arrow). We removed the white cap for this photo. Make sure all the gears are properly meshed. Set the left case half aside for now.

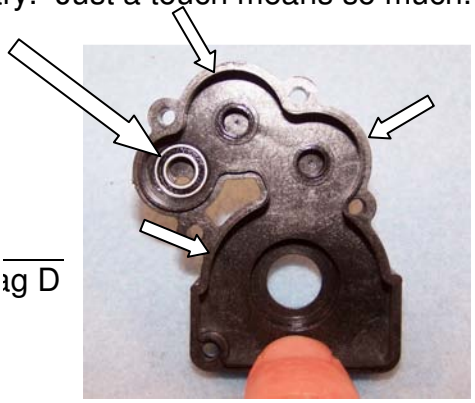






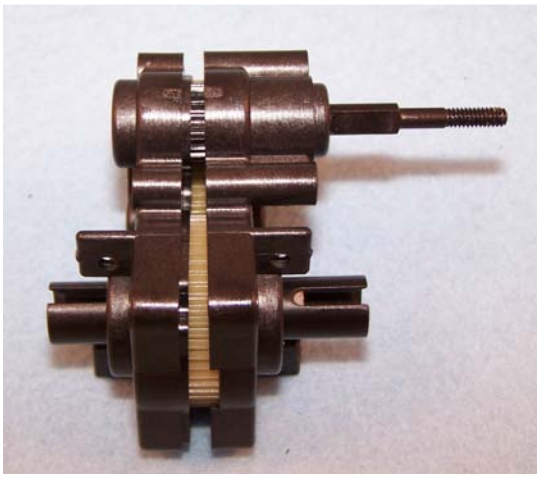


D8) Insert the remaining 3/16" X 3/8" rubber sealed bearing (6200) from Bag D into the top shaft boss in the right transmission case half. Some Team drivers place a small bead of inexpensive grease around the mating surface of the right transmission case half. (small arrows) This grease helps keep dirt out and does not lubricate anything. Grease attracts dirt; paradoxically this grease seals out dirt, so use no more than is necessary. Just a touch means so much.



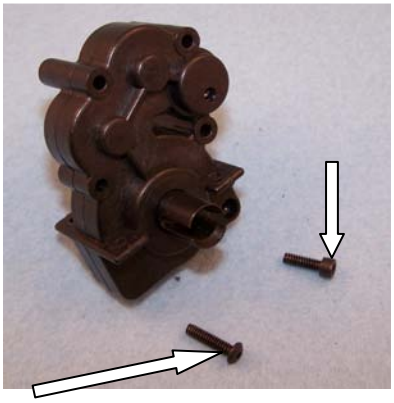
D9) Some Team drivers put a small amount of AE Stealth lube (not included) on the teeth of their diff gear to lubricate the transmission. Others do not, saying the plastic gears are more free without lube. Pay your money and take your pick.

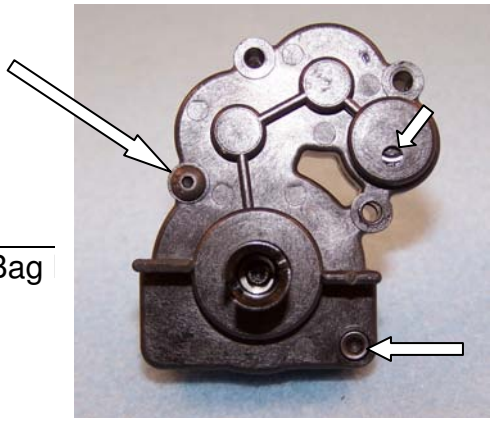
Carefully put the two halves of the transmission together. Make sure everything rotates *very* smoothly. The bearings may be a bit stiff, but they will break in quickly. A binding or "hitch" is bad, and should be repaired now, while it's easy to do. Later is hard… A common cause of binding or hitch is a slight imperfection in one of the gear teeth, or a particle of dirt on a gear. Wipe excess grease from the outside of the case.



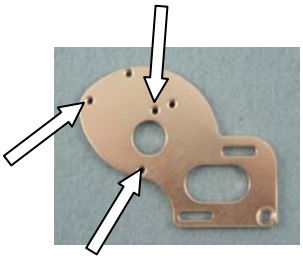
You may notice some side-to-side movement of the diff. This is OK. Some drivers shim the diff into the center, others do not. The small movement seems to have no effect on performance or service life and helps ensure minimal side loading of the outdrive bearings.

D10) Install the 4-40 X 3/8" cap head bolt (6001) in the lower corner (short arrow) and the 4-40 X 1/2" button head bolt (6043) in the rear center of the transmission (long arrow). Leave them finger tight until instruction D12. Make sure the head of the 3/8" cap head bolt is fully down in its boss and no part of the bolt protrudes from the transmission case on either side so the transmission will fit into its "box" at the chassis rear. The hole (shortest arrow) is to make bearing removal easy.

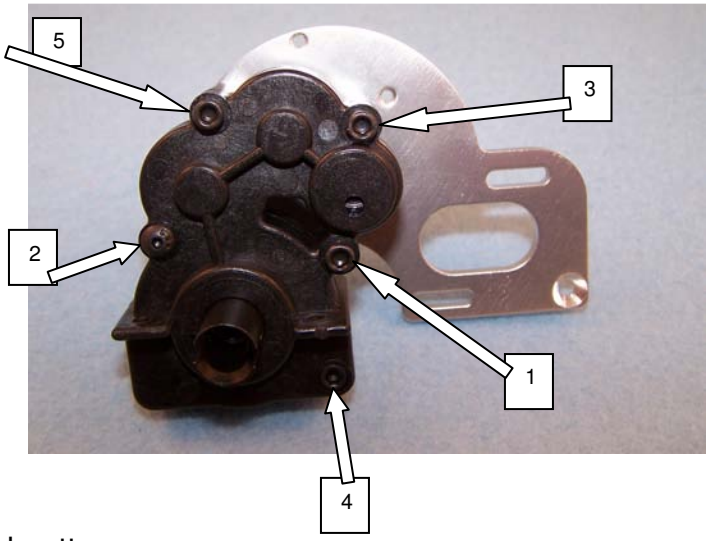




D11) The motor plate (1232) has two extra tapped holes which are useful to install a fan for the motor (left photo). The arrows in the right photo point to the three holes used to install the plate to the transmission. Team drivers put a drop of thread lock into these three holes prior to the next step. Thread lock on the long bolts will come off in the case, so a drop here works best.

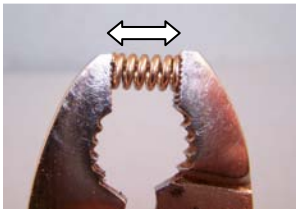


D12) Insert three 4-40 X 1" cap head bolts (6006) through the transmission case, threading them into the motor plate finger tight. (long arrows) Check once again to ensure the transmission rotates smoothly but without excess slop. The bearings, which are greased, and the gear meshes may need to break in, so a transmission with a few minutes' running may be more free; however this new unit should be perfectly smooth. No "hitch" or "high spots." This is your last chance! Now put the final torque on all five transmission bolts using a star-shaped pattern.

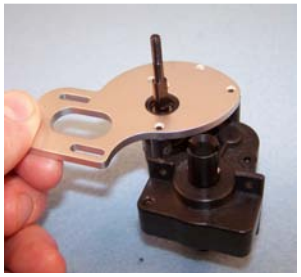


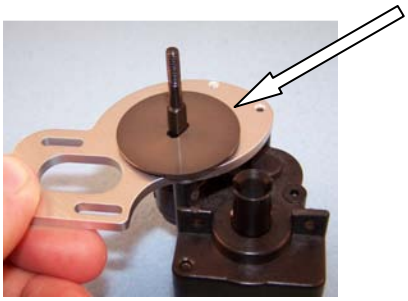
SLIPPER ASSEMBLY

D13) Remove the slipper spring (ASC9605) from Bag D and compress it with a pliers two or three times. Do this now because your hands will be full later, then set the spring aside.

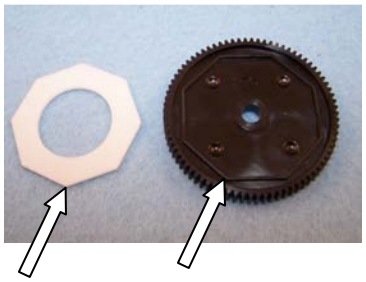


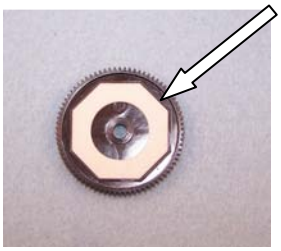
D14) Hold the transmission so the motor plate is up and the top shaft is straight up. Place a slipper plate (5530) over the top shaft with the hub down, flat side up. The flat sides inside the bore of the slipper hub will key to the flat sides of the top shaft. Be careful not to scratch the flat side of the slipper plate.



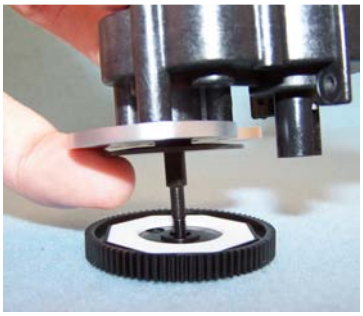


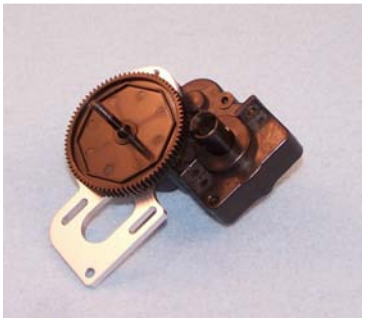
D15) Position a slipper pad (ASC9603) on the spur gear (ASC 9652) so the outer edge of the pad properly engages the hex in the spur.



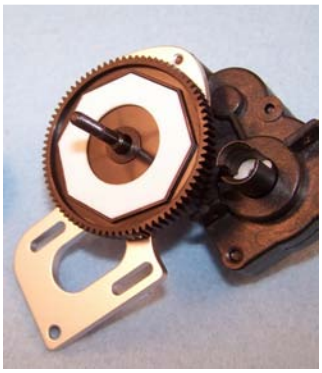
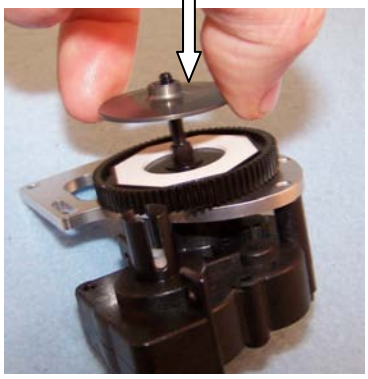


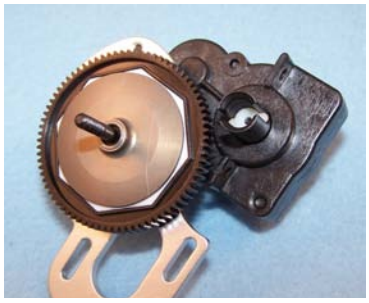
D16) Hold the pad on the spur. Turn the transmission over, holding the plate on the shaft, and slide the spur and pad on the top shaft with the pad side of the spur toward the slipper plate. Slide the pad and spur all the way on until the pad touches the plate. Make sure the pad stays properly engaged in the spur gear's hex. When it's all together, turn the transmission back over so the top shaft is pointing up -- the spur and pad should stay where they belong. Sure is easy to do this when the transmission is out of the car!





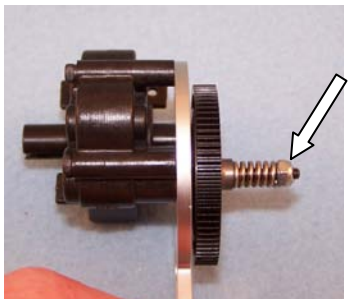
D17) Hold the spur and pad in place against the inner slipper plate until this step is complete. Place the second slipper pad into its hex on the spur gear without letting the inner pad loose. Then, slide the second slipper plate over the top shaft, this time with the flat side down toward the spur and pad. The hub will be to the outside. Hold the whole thing together with your thumb.

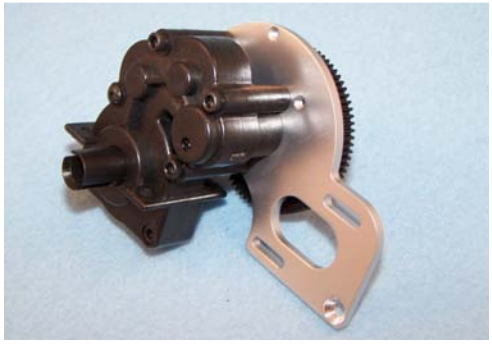


D18) Put the slipper spring over the top shaft and secure with the 5-40 locking nut (6074). Once the nut begins to compress the spring, you can let go of the plate. Consult the Tuning Section for slipper adjustment.





OK, transmission is done. Let's get the rear end on the car!



BAG E

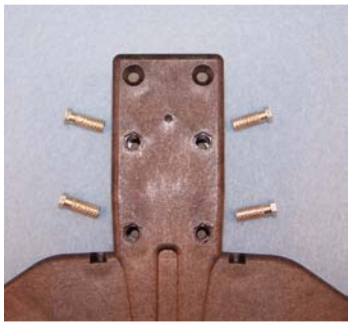
TRANSMISSION INSTALLATION

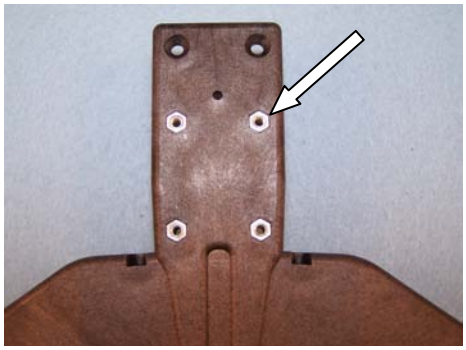
PREPARATION

E1) Install four ½" threaded inserts (6300 -- the long ones) in the rear of the chassis from the bottom. Make sure the hex of each insert seats properly in the chassis. You may have to tap lightly to fully seat the inserts.

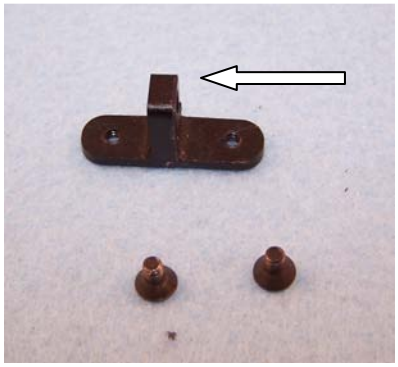
Some inserts are more difficult to seat. In those cases, Team drivers use one of the flat washers and one of the 5/8" cap head bolts from Bag E. Place the bolt and washer down from the top through the hole in the chassis and thread it into the top of the insert. Hold the insert's hex with a pliers and screw in the bolt to draw the insert up into the chassis. Then remove the bolt and washer.

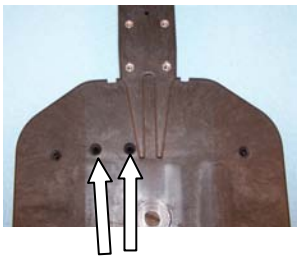
The inserts should remain in place through the transmission install, and it's easiest to put them in now. The rearmost holes in the chassis will be used later – they do not have hexes for the inserts.

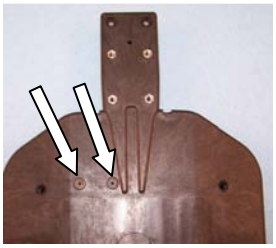


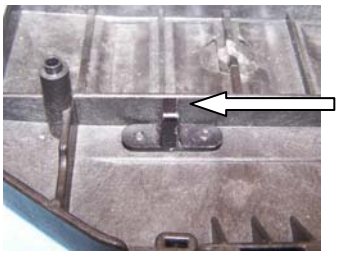


E2) Install the motor plate support bracket (1130) using two 4-40 X 1/4" flat head screws (6021). The screws come up from underneath the chassis and thread into the support. Make these two bolts just finger tight for now. Notice the support is off-set to the left.



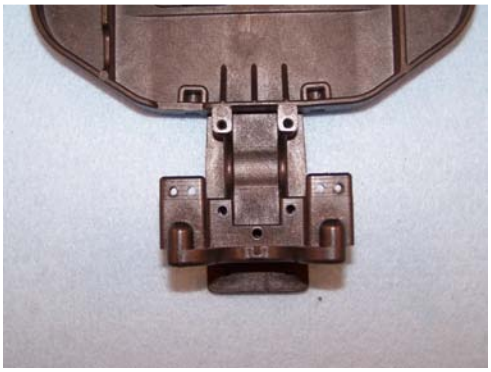


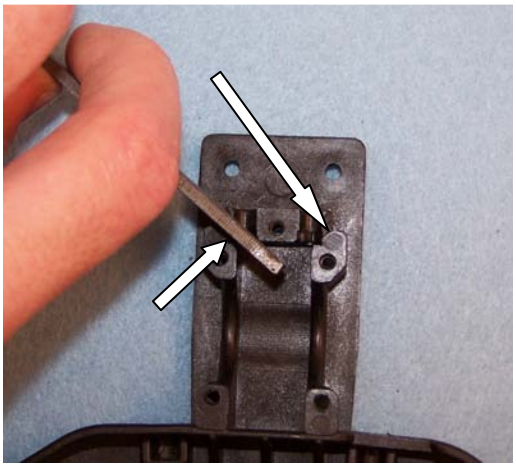




BULKHEAD

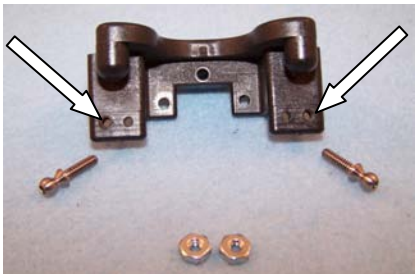
E3) NOTE: Tolerances are tight where the chassis mates with the bulkhead. Much stress is transmitted through these parts and a tight fit adds strength. Most bulkheads are OK, but some come out of the mold slightly oversized in one small spot. Test fit your bulkhead to ensure it fits snugly and properly into the chassis, pressing it down and forward so the transmission bolt holes like up with the holes in the chassis. (left photo) If you have a bulkhead that does not fit all the way forward, or that pops back when you let go, lightly file the rear inside corners of the chassis "box" to ensure proper fit. In the right photo, the long arrow shows where the chassis was filed, the short arrow shows the file contacting the chassis.



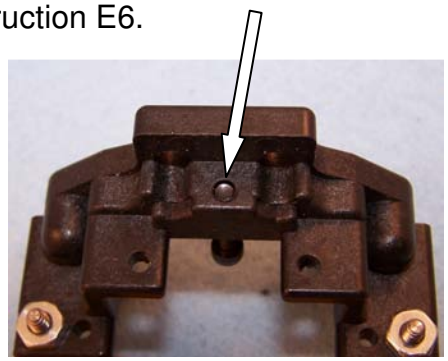


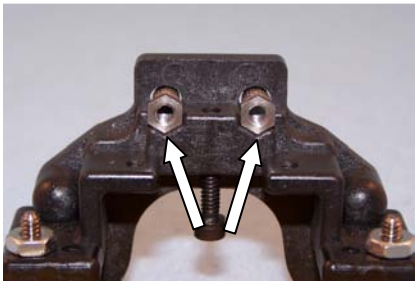
E4) Install one 3/8” ball stud (6172) in the ball stud land on each side of the bulkhead (1310). The studs go down from the top as shown. The photo shows the outside, or #2 hole and no Dirtz Dialed Partz shims. Consult the Tuning Section and Set-Up Sheet to determine which hole you will use and the number of shims you want. If you use the #2 hole, put a 4-40 nut (6070) on the bottom of each ball stud to help prevent breaking the bulkhead.

TEAM TIP: Some drivers use a #4 washer (6080) above the nut to further spread the stress on the bulkhead. Many drivers prefer a locking nut (6071). It’s a pain to remove and replace the nut when the car is assembled – you wind up holding the nut with pliers. To re-install, thread the ball stud through the bulkhead and part way into the nut, then let go of the nut and back the ball stud out until the nut firmly contacts the bulkhead. Re-grip the nut and tighten the stud. This assures the nut firmly contacts the bulkhead.

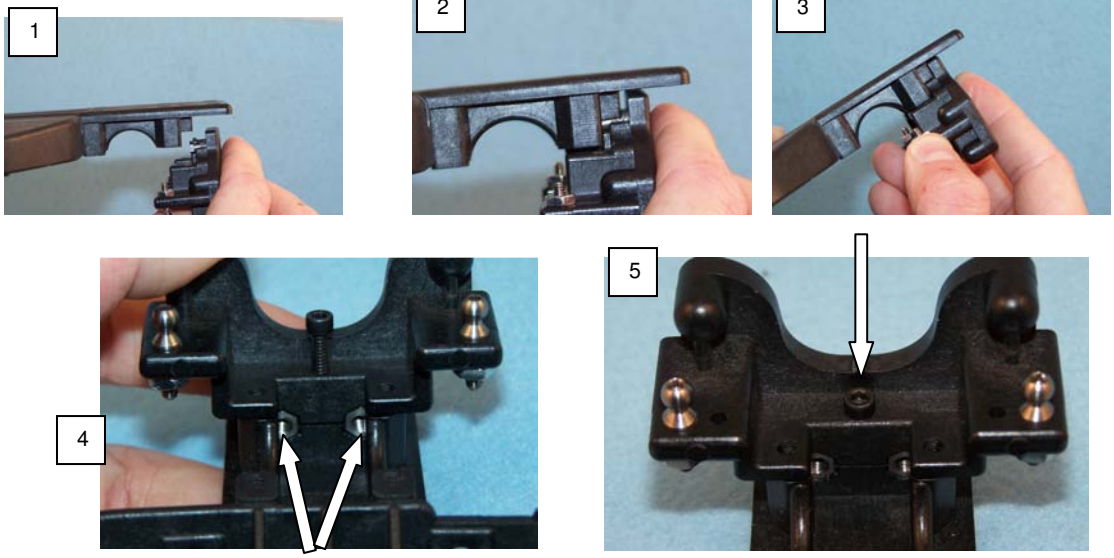


E5) Install a 4-40 X 5/8” cap head screw (6003) in the rear center hole of the bulkhead. Put the screw in until the threads are almost ready to emerge from the part. (Left photo) Then turn the bulkhead upside down and place the two 3/8” threaded inserts (6300) in their holes. The hexes face forward and fit in the molded hexes of the bulkhead. Note that half of the hex is molded into the bulkhead and half into the chassis. Keep the bulkhead upside down for instruction E6.



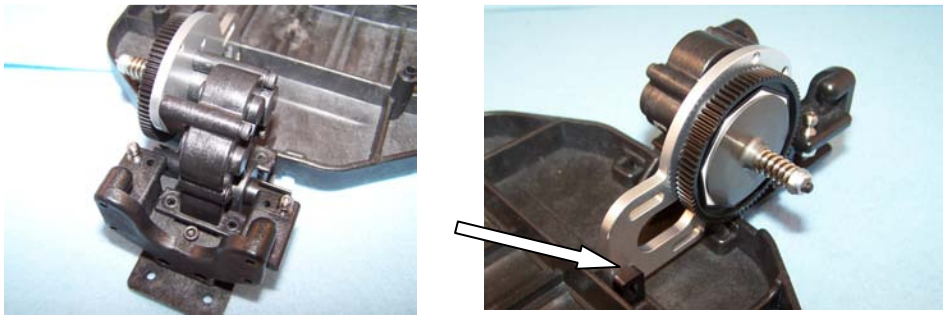


E6) Turn the chassis upside down and mate the bulkhead to the chassis. Take care that the threaded inserts remain in the hexes in the bulkhead and go into their hexes in the chassis. This is a pain to do, but most likely you'll only have to do it once. When you've got it right, secure the bulkhead by installing the 5/8" cap head from E5 above.

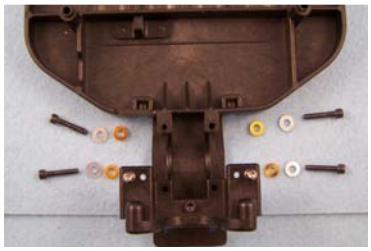


INSTALL THE TRANSMISSION

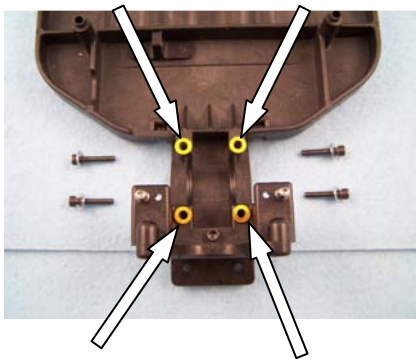
E7) Place the transmission with motor plate in its box. It should be a snug fit but should slide up and down without too much force. Check that nothing is catching. The motor plate should be snug against the right side of the motor plate support.

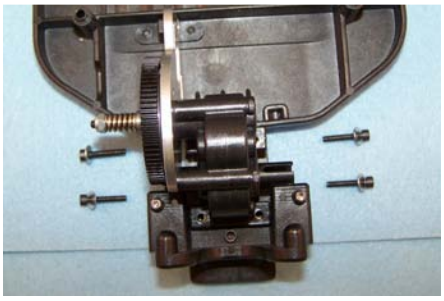


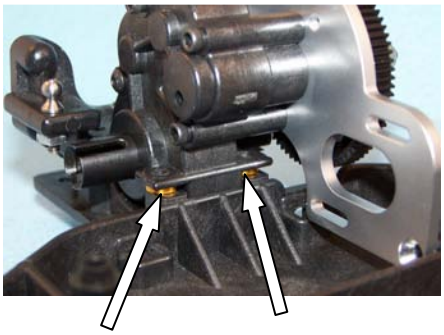
E8) Remove the transmission. Check the Tuning Section and Set-Up Sheets to determine how high you will mount your transmission and select the proper shims from the bag of shims (5700). Here we use gold .060" shims. Gather four 4-40 X 5/8" cap head bolts (6003), four #4 washers (6080), and the four shims.



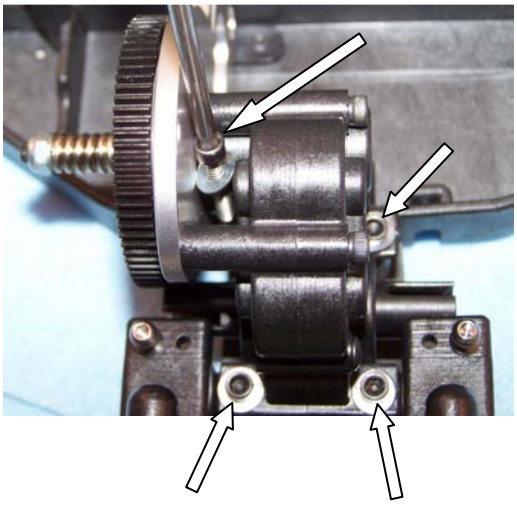
E9) Carefully place the four shims on the chassis over the transmission bolt holes. Ensure that no part of any shim extends beyond the inside edge of the chassis "box." Slide the transmission down over the shims so the tabs are seated on the shims.



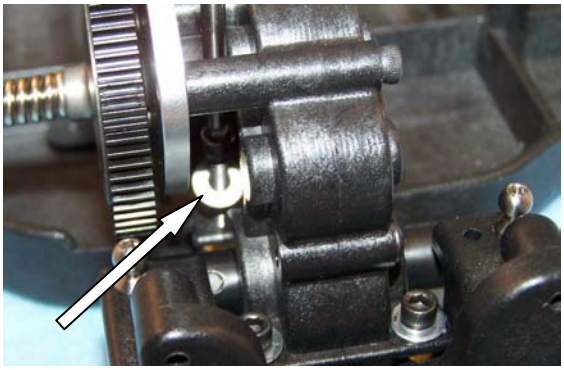




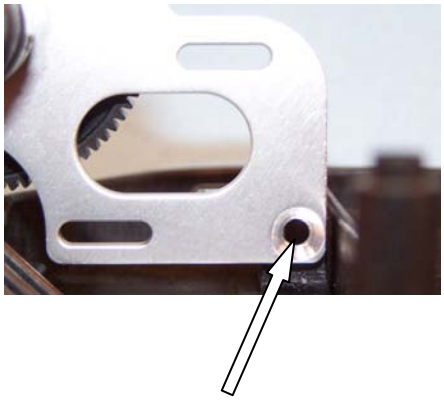
E10) Install the four bolts with washers through the transmission tabs. The right side two and the one at left rear are easy. Install them first, and leave them finger tight. (short arrows) Now place the left front bolt on your wrench with its washer and sneak it down between the transmission and the motor plate into its hole. Ensure that this bolt is threaded properly into the threaded insert, not cross-threaded, and tighten. Now torque the other three.



TEAM TIP: The washer wants to fall off the left front bolt. Most drivers slide this bolt down on an angle so the washer rubs against the back of the top shaft boss, holding the washer at the top of the bolt. As the tip of the bolt goes through the transmission tab, they straighten the wrench and proceed.



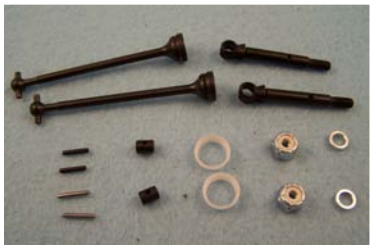
E11) Install the 1/2” flat head screw (6023) through the motor plate and motor plate support. Place a #4 washer (6080) on the end of the bolt and secure with a 4-40 locking nut (6071). Now tighten the bolts under the chassis that hold in the support.



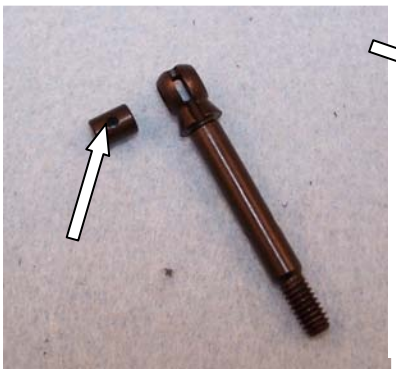
BAG F

BUILD THE C-CVDs

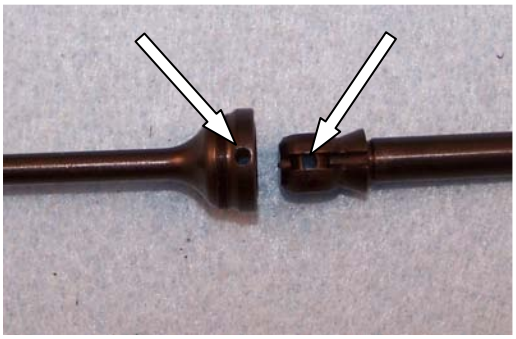
F1) Open the bottom of Bag F and get out the C-CVD parts. (5800 -- left photo) Set the wheel nuts, two aluminum spacers, and two smaller black roll pins aside. The first work on the C-CVD axles will use the two driveshafts, two axles, solid silver pins, CVD couplings, and white rings. (right photo)

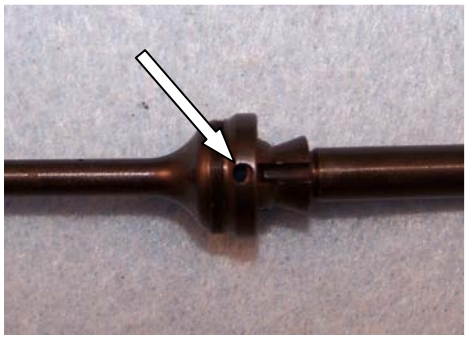


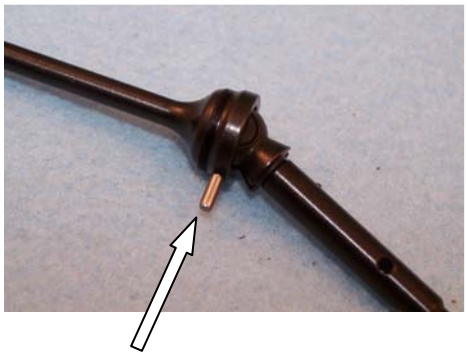
F2) We'll build one axle first, then the second. Insert the black cylindrical coupling into the head of the CVD Axle. Be certain the hole in the coupling lines up with the slot in the axle so you can see completely through the coupling's hole.



F3) Keeping the coupling in place, put the axle & coupling into the cup of the driveshaft. Align the coupling hole with the holes in the driveshaft and slide the silver pin through so it is flush with both sides of the driveshaft cup.

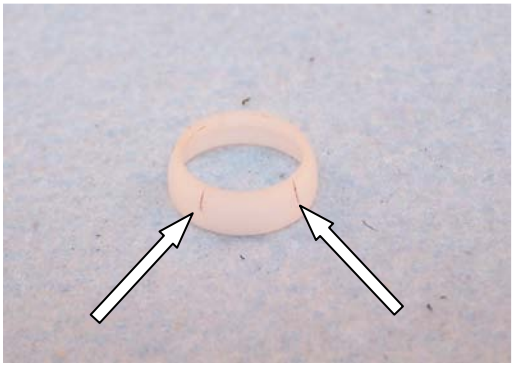




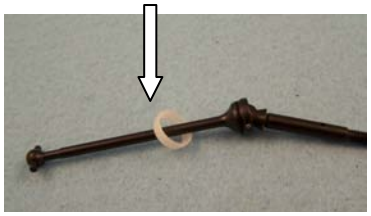


F4) DO NOT USE PLIERS ON THE WHITE RINGS. *Ever*. Once crushed, even slightly, by pliers, they will not hold, and there is a good chance you will break them.

TEAM TIP: Lightly score the white rings with a hobby knife to make gripping them easier. Be very careful not to seriously cut the rings. Just a touch means so much.



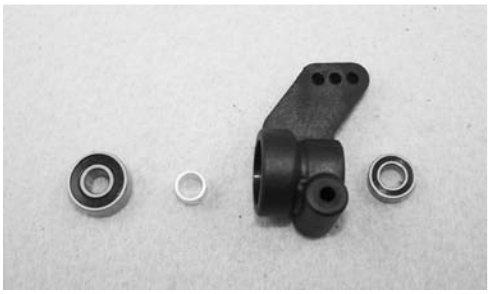
F5) Place the white ring over the diff end of the driveshaft so that it mates with the cup and screw it securely onto the cup, covering the holes for the pin. Snug it up tight with your hands. You may use a rag or your shirt for added grip. The gorilla has strong hands…



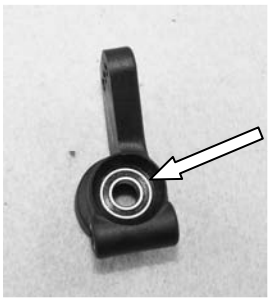
F6) Repeat for the other C-CVD.

BUILD THE REAR HUBS

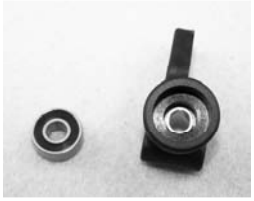
F7) Now use the top part of Bag F. Take out the two B44 rear hub carriers (ASC 9730), the four bearings, and two crush tubes (ASC7933).

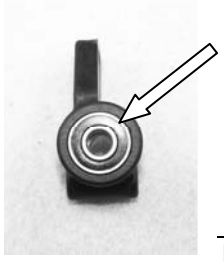


F8) Again, we'll do one hub first. Install the 3/16" X 3/8" rubber sealed bearing (6200) in the inside bore of the hub carrier. A nut driver or hex wrench helps here.



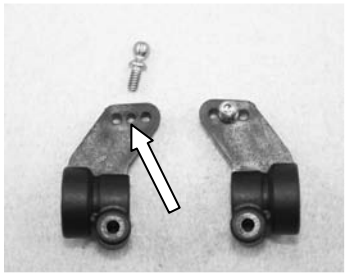
F9) Place the crush tube inside the hub carrier, then install the 3/16" X 1/2" rubber sealed bearing (6206) in the outside bore.



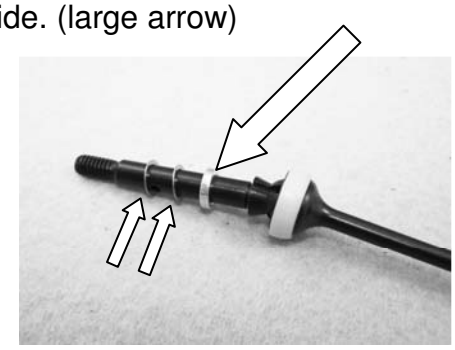


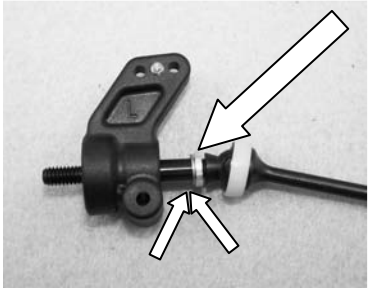
F10) Repeat for the other hub carrier.

F11) Check the set-up sheet and Tuning Section to determine your ball stud placement. The hub carriers are zero degree and will be installed on the opposite side. Install a 3/8" ball stud (6172) in each carrier so the ball is on the side without the letter. Here we are using the B (middle) hole.

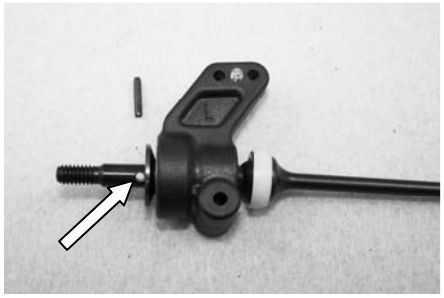


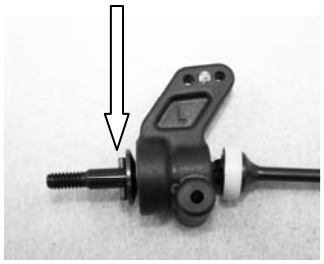
F12) Retrieve the parts set aside at the beginning of this Bag and the four tiny shims (6450) & two wheel washers (6451) still in Bag F. Place an aluminum spacer (5661) and two tiny shims on each axle and slide the axles through the hubs as shown. The spacers & shims are on the inside. As transmission height changes, or to compensate for slight manufacturing variances, one or both tiny .010" spacers (small arrows) may be moved to the outside. The larger aluminum spacer always stays inside. (large arrow)





F13) Install the wheel washer with the smaller diameter toward the bearing and secure by sliding the black roll pin through the hole in the axle. There should be a small amount of end float in this assembly. If the axle is too tight, or does not spin *very* freely, remove one of the tiny shims from the inside and try again. (Wheel washer in your kit is not as pictured.)





F14) Store the nut by putting it on the end of the axle. Finger tight will do.

BAG G

REAR CONTROL ARMS

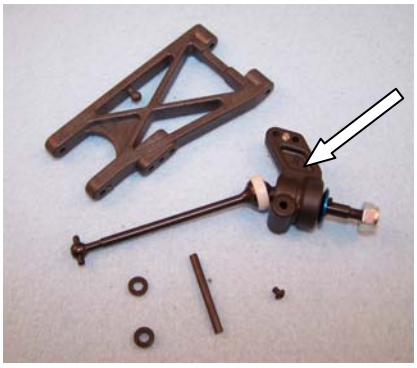
PREPARE THE ARMS

G1) The control arms (3012) are shipped with the runners left on. Some call these the "gurfelmurgles"; all we know for sure is that we purposely leave them on after molding to ensure the arm keeps the proper spacing. They shrink as they cool, and cooling goes on for several hours when they are all confined together in a box after molding.

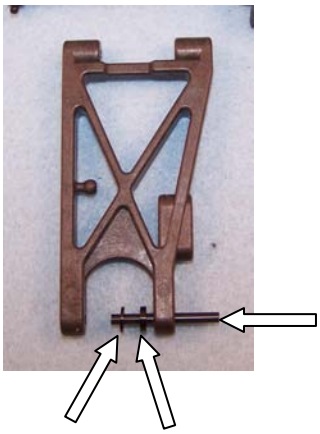
We suggest you use pliers to twist the gurfelmurgle off with a circular motion. If you cut them off with a wire cutter, you will leave an indentation in the end of the arm, but twisting them off with pliers usually leaves the arm smooth. Then, dress any flashing and you're ready to go.

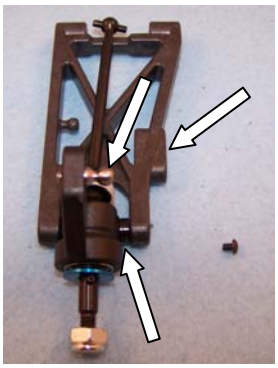
HUB CARRIERS ON THE ARMS

G2) Check the Tuning Section and Set-Up sheet for hub spacing. These instructions show the hub spaced forward, so the shims are to the rear. The X – 6 Squared Kit uses B44 hub carriers, but they are put on the arms opposite so the camber link is close to straight. We will do the left arm first, with the right hub, marked "R."

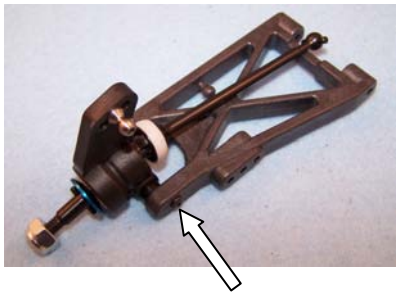


G3) We'll need some Dirtz Dialed Partz shims here, so where is that bag? Start the steel outer hinge pin (saved from Bag A) in from the rear of the arm and install two shims, one .030" and one .060" from the shim bag. Be careful to keep both shims on the pin and place the hub carrier in the arm. Slide the pin forward through the bottom of the hub carrier and into the front portion of the arm. The ball stud should be to the rear of the arm with the shock mounting holes.





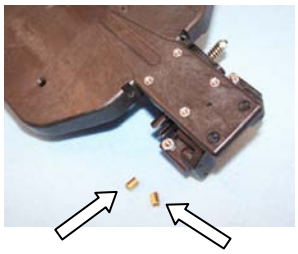
G4) Secure the hinge pin with a 2-56 X 1/8" button head screw (6053). Make sure the gorilla is still in his cage.

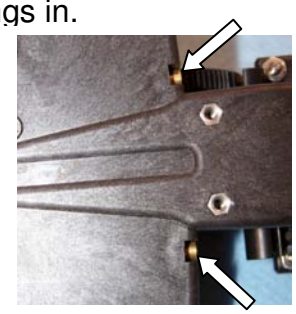


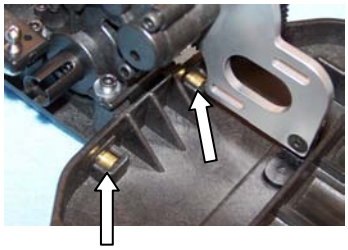
G5) Repeat for the right side using the left hub carrier, marked "L."

ASSEMBLE ARMS TO THE BUGGY

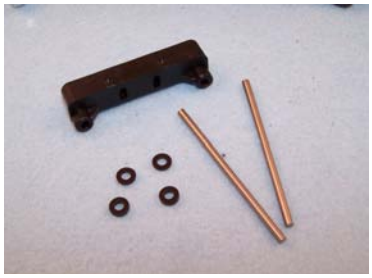
G6) Place the two brass bushings (6142) in the rear of the chassis, one on each side of the transmission box. Some Team drivers put a small drop of Shoe Goo in the chassis to hold the bushings in.

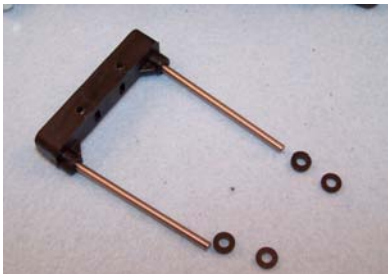


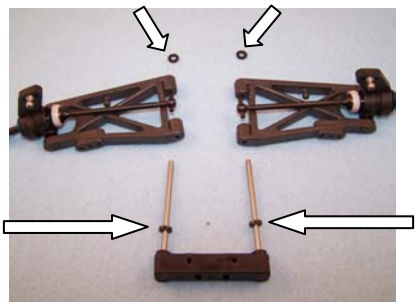




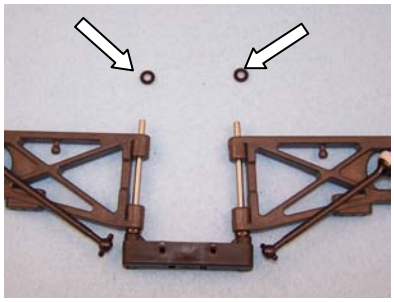
G8) The X – 6 Squared is supplied with two toe-in bars (3211), 3 degree and 4 degree. Consult the Tuning Section and Set-Up Sheet to determine which bar you will use. Here we are using the 4 degree bar. Team drivers pre-tap the two vertical holes in the bar. Place the two Lunsford Ti hinge pins (6141) in the toe-in bar. Again, consult the Tuning Section and Set-Up sheet to determine arm spacing. Here we have .060" (long arrow) behind the arm and .030" (short arrow) in front. Place one .060" shim on each hinge pin.

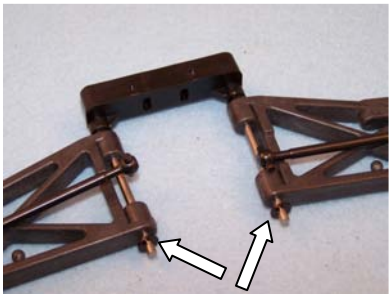




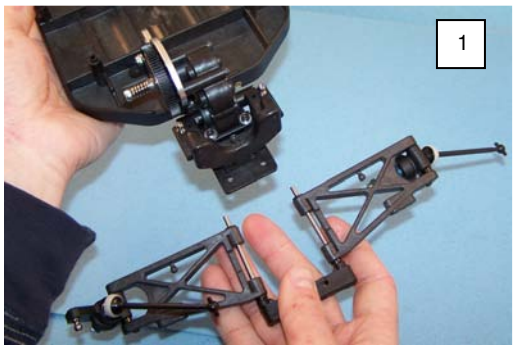


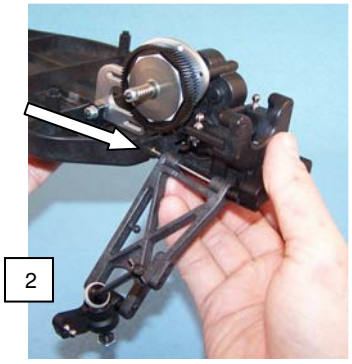
G9) Place the control arms on the hinge pins. The round part of the bar where the pins are should be down. The shock mounting holes are toward the rear of the arms. Now put a .030" shim on each hinge pin ahead of the arm.

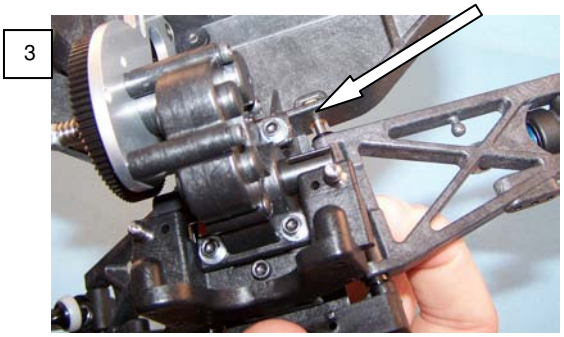


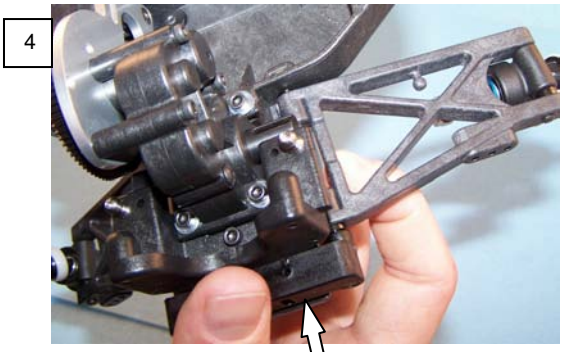


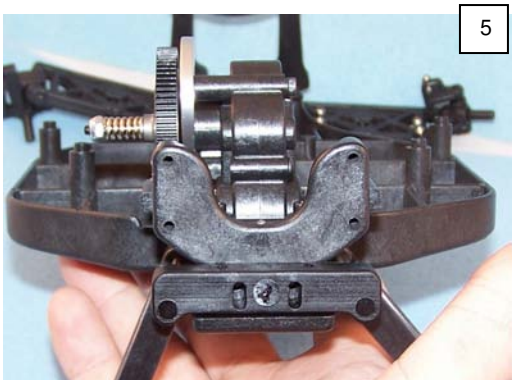
G10) Now the tricky part. Holding the toe-in bar and arms assembly in one hand and the chassis in the other, slide the hinge pins into the brass bushings. The toe-in bar should be on top of the chassis behind the bulkhead.



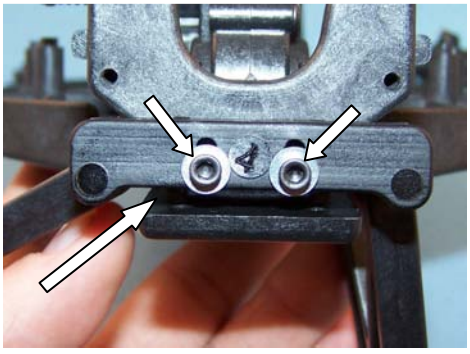




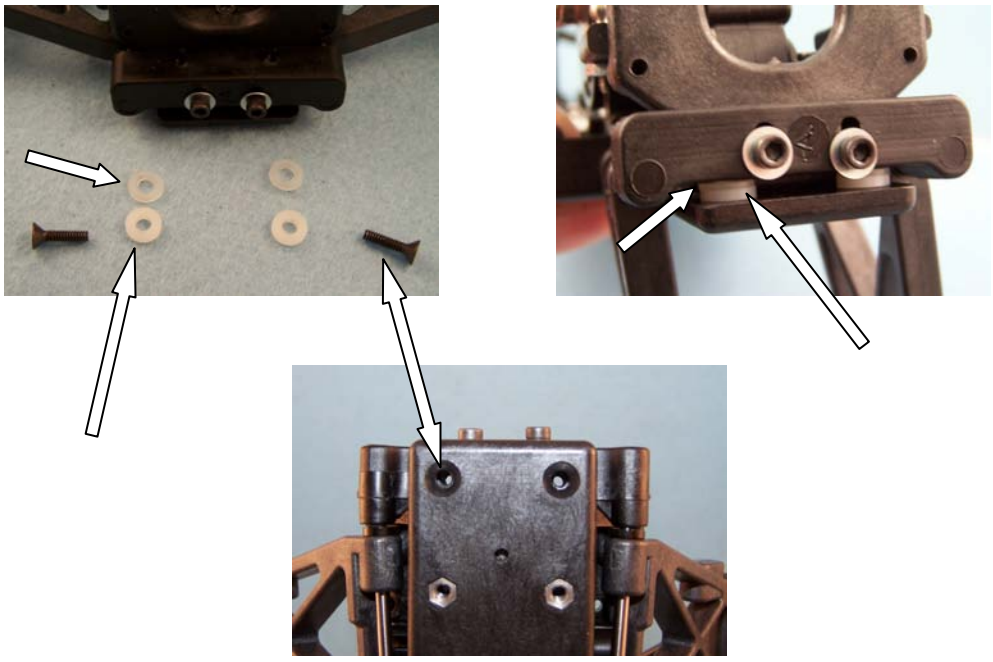




G11) Secure the toe-in bar with two 4-40 X 3/4" cap head screws (6004) and flat washers (6080). (small arrows) These screws go in from the rear through the two slots and thread into the threaded inserts. Leave the screws finger tight for now so the bar will slide up and down, and leave a gap between the bar and the chassis. (large arrow)



G12) Consult the Tuning Section and Set-Up Sheet to determine your anti-squat setting. Bag G contains a small bag of plastic anti-squat shims (3250), four .060" and two .030" that allow you to adjust in increments of .030" from zero to .150" Here we have used one .030" and one .060" shim to make .090". Slide your shims over the two holes in the chassis and under the toe-in bar. Secure the toe-in bar and shims from below using two 4-40 X 1/2" flat head screws (6023). If you use zero shims, the screws may protrude from the top of the bar. Now tighten the cap head screws from G10 above.

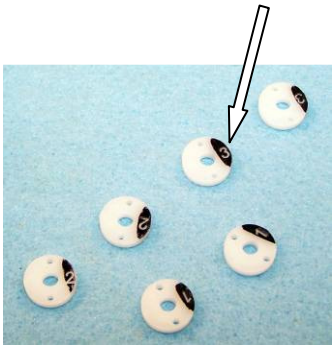


Almost finished now.

Shocks (Associated V2)

S1) Set the buggy aside for now and prepare a clean area to build the shocks. We suggest you leave one pair of shocks in their bag while you build the other. We're going to be building the rear shocks (ASC 7478) now. Open the bag and remove the contents. We've seen different combinations of sub-bags, so your parts may be packaged differently than shown here. Check the set-up sheet for the pistons and oil (not included) that you will use.

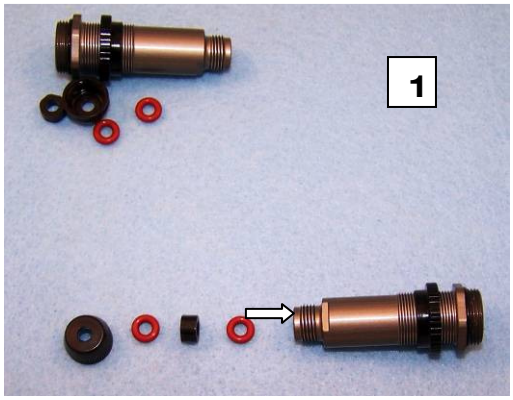
TEAM TIP: Use a felt pen to lightly color the area of each piston where the numbers are molded into them. Be very light as you run the marker over the piston so ink does not run down into the molded number. Now your pistons will be easy to identify.

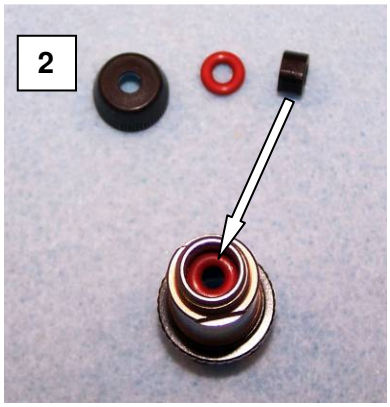


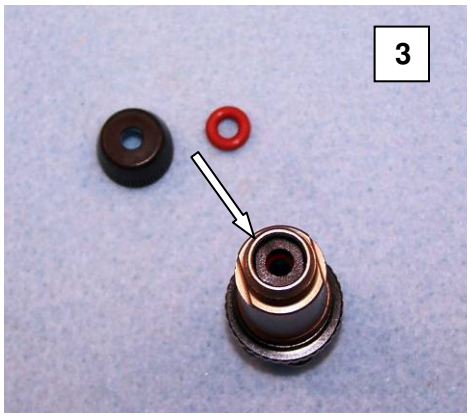
S2) Find the four black O-rings, the shock bodies, and the shock collars. You'll notice one pair of the black O-rings is larger than the other (large and small arrows, respectively); slip one large ring inside each black collar. This O-ring helps prevent the collar from moving due to vibration, keeping your ride height even through a run. Screw the collars onto the shock bodies, knurling side up.

S3) Slip the other pair of O-rings over the small area of threads toward the top of the shock bodies. The O-ring sits in a groove just above the hex machined into the shock body (check the arrow). You'll have to stretch the O-rings to get them over the threads, but be careful not to tear or break them. Team drivers stretch and work the O-rings around in their hand before putting them on.

S4) Now assemble the four small orange O-rings, two thick black spacers, and the small cartridge caps. Apply a coating of shock oil to one of the O-rings and push it into the bottom of the shock body. One of the shock ends is about the right size to push it in the body. Next, put in the one of the black spacers, and then add a second orange O-ring, again coated in shock oil.





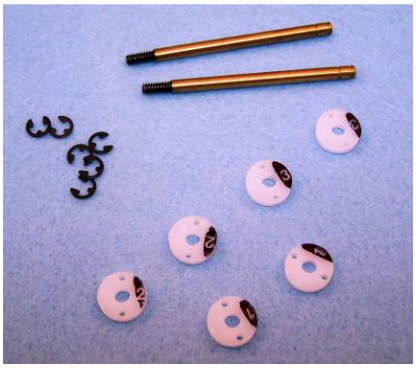


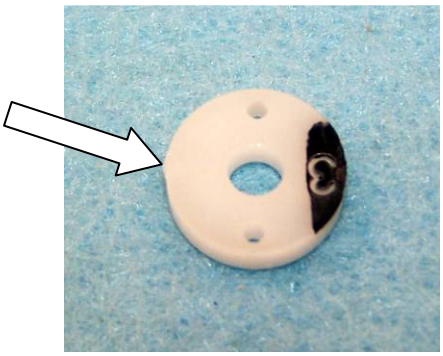
TEAM TIP: Many drivers prefer to use ASC 1105 Green Slime on the O-rings instead of shock oil.

S5) Screw the cartridge cap onto the bottom of the shock body. No need for the gorilla here, just a nice snug fit will do.

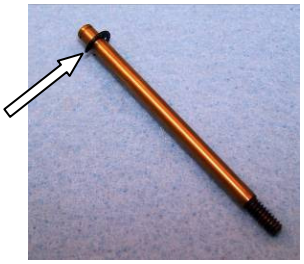
S6) Repeat steps S4 and S5 for the other shock body.

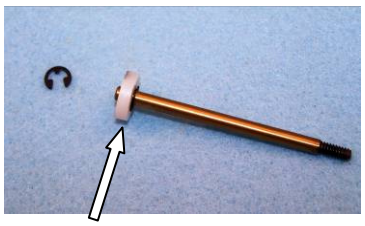
S7) Set the assembled shock bodies aside briefly and find the shock shafts, E-clips, and shock pistons. Inspect the pistons and remove any burrs (the arrow points at a small one) with a hobby knife or fine flat file. Take care to leave the outer edge as round and smooth as possible so it doesn't scratch the shock body in use. If you check all the pistons now you won't have to worry about it when you're at the track changing set-up. Reference the set-up sheet and select the pair of pistons you'll be using.

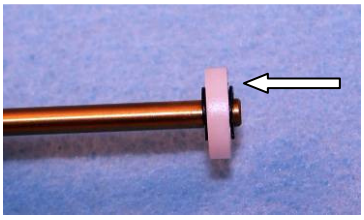




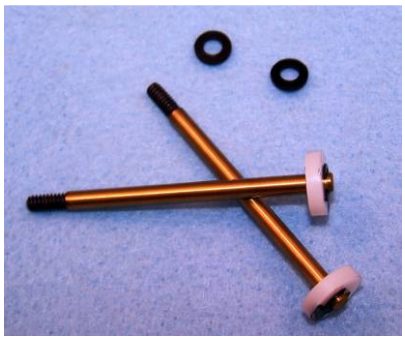
S8) Pop an E-clip on one shaft in the lower groove, closest to the threaded end. Slip one of the pistons onto the shaft until it touches the E-clip. (Make sure these are the right pistons; double check the set-up sheet if you need to, nobody's watching!) Then snap a second E-clip just above the piston. If the gorilla launches the E-clip across the room don't worry, there are plenty of spares!







S9) Repeat step S8 for the other shock shaft.

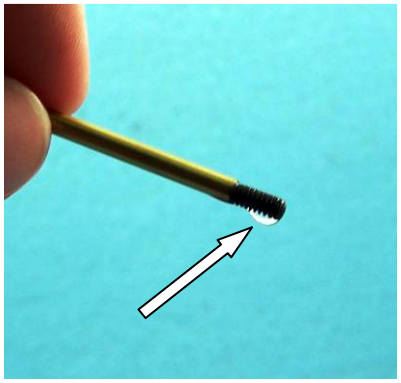


S10) Reference the set-up sheet to see if you'll need any internal limiters. Look at the "shock length" entry; built normally with no internal limiters, the V2 shocks will be the following lengths:

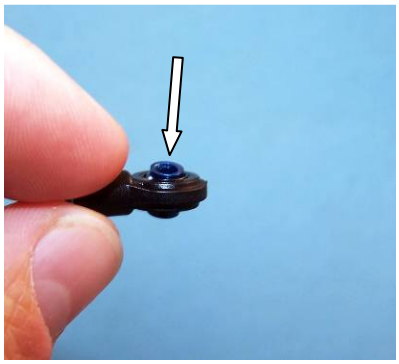
Front: 3.02"
Rear: 3.55"

If the listed shock length is shorter than that, you'll need to add internal limiters to make up the difference. Here we are using standard .030" limiters to achieve a rear shock length of 3.52" (one per shock). If the listed shock length is a touch *longer*, that's OK, you can unscrew the shock eyelet (installed in step S13 below) to achieve the extra length.

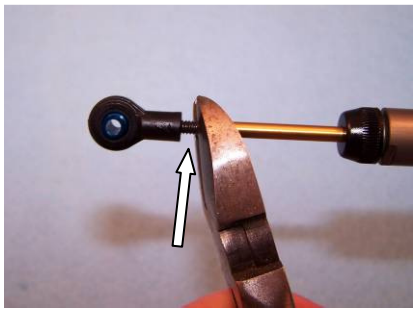
S11) Put a drop of shock oil over the threads on one of the sock shafts, and insert the shaft into the top of the shock body, threads first. The oil helps protect the O-rings as the shaft glides through. Here too, many team drivers use Green Slime on the threads instead of oil. Repeat for the other shock shaft and body.



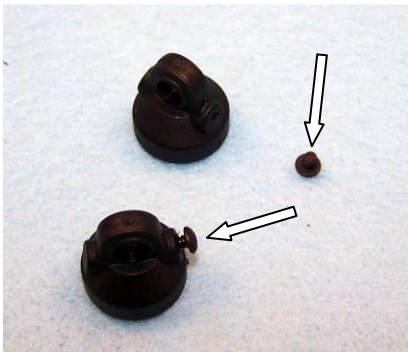
S12) Find the shock ends and balls. Pop the balls into the shock ends using a pair of pliers.



S13) Screw the shock ends onto the shock shaft. Be careful not to mark or score the shock shaft: either use a soft rag in the jaws of a pair of pliers, or as shown carefully grip the shaft with a pair of wire cutters *just* above the threads; this small area will be taken up by the spring cup. Screw the shock ends on until they tighten up. If you need extra shock length (from checking back on step 10), unscrew the ends up to two turns. Each turn out adds approximately .030" to the overall shock length.



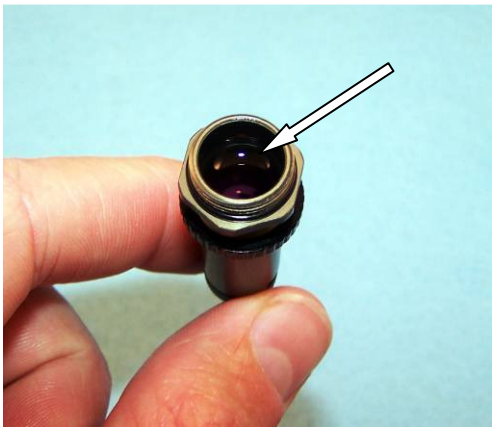
S14) Find the shock caps and the small 2-56 1/8" button head screws. Use a screw to pre-tap the small bleed hole in each shock cap. This will make installation easier when you bleed the shocks below.

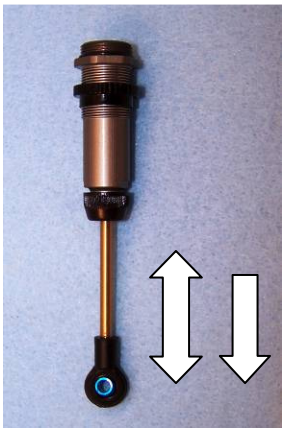


TEAM TIP: Some drivers will set aside this pair of shocks now and build up the other pair until they reach this point, then fill and bleed all the shocks together. This allows them to deal with the oil mess just once, but they must take care to get the correct oil in the correct shocks.

S15) We're ready to fill and bleed the shocks! Pick a shock and move the piston all the way to the bottom. Now pour in oil until the shock body is about 75% full. Team drivers tilt the body on an angle and pour the oil along the side to help prevent air bubbles from forming.

Slowly work the shock shaft up and down to let any air bubbles beneath the piston to escape. Be careful the piston does not come out of the oil, as that will just trap more air! Finish with the piston in the down position. If you can, set the shock aside for a bit to let all the air bubbles rise and escape.





S16) This step can feel like you need three hands. Make sure you have a towel ready to soak up the excess shock oil, and put one of the 2-56 1/8" button head screws on a wrench. Fill up one of the shock bodies all the way, to the point of nearly overflowing. Pick up one of the molded shock caps, with your finger closing the bleed hole, and fill it about 1/3rd with shock oil. Quickly flip the cap over and install it on the top of the shock. Make sure the shock cap threads squarely on the shock body; having to unscrew and refill the cap is better than replacing a cross-threaded shock cap. Keeping the bleed hole up, tighten the shock cap completely.

S17) With a rag around the bleed hole, slowly push the shock shaft all the way into the shock to bleed out excess shock oil. This should just take one firm stroke; hold the shock shaft all the way into the body until oil has stopped coming out of the cap. If no oil comes out, you need to repeat step S16, adding oil at the start.

S18) Finally, install the 2-56 1/8" button head screw while the shaft is fully compressed. Clean up the oil and work the shock a few times; the compression and extension strokes should feel nice and even over their entire lengths. After compression, the shaft should 'rebound' around 1/8". If the shaft will not go all the way into the body, or it rebounds further than desired, open up the bleed screw and compress the shock shaft a few times, pushing out more oil. If the shaft doesn't push out at all, or it sounds like there's excessive air in the shock body, you'll need to take off the shock cap and repeat steps S16 and S17.

S19) Set the completed shock pair and spring cups aside for now; everything else (extra shock pistons, E-clips and perhaps shock spacers) can go in your spares. Grab the other shock package (probably ASC 7474, the fronts) and repeat these instructions for the other pair!

TEAM TIP: Notice that the spring cups that came with the front shocks are different than those with the rears. The fronts are Team Associated's offset spring cups, which raise the spring up and aid in setting ride-height with certain springs and set-ups. If you ever find that the shock collars are against the top of the shock body and you still wish to lower the ride height, try switching the front spring cups with the rears.

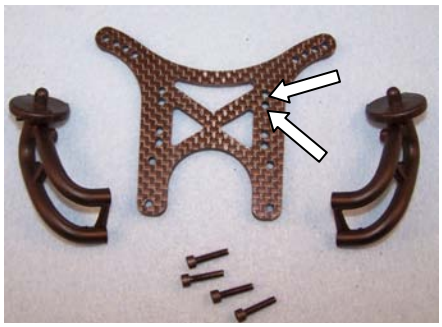
After all four shocks are built, set all the shocks and spring cups aside for a few moments and lets go on to Bag H.

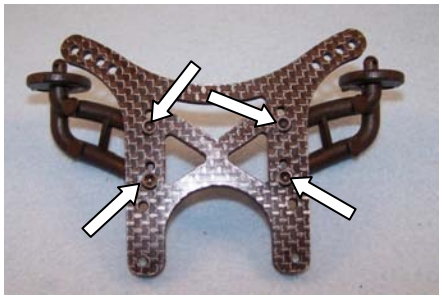
BAG H

REAR TOWER, SHOCKS, TURNBUCKLES

TOWER

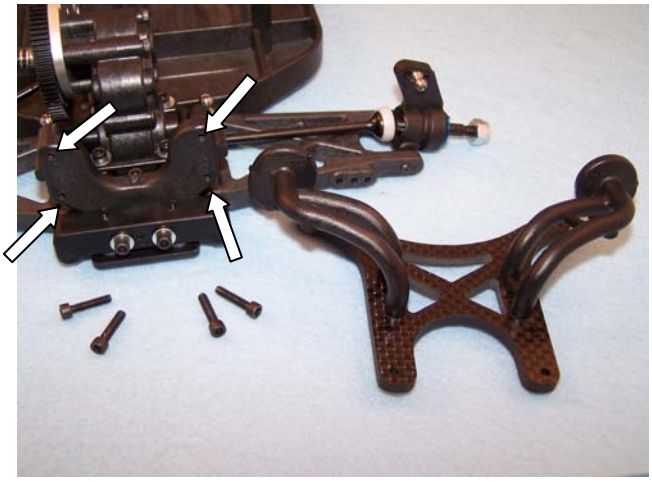
H1) Check the Tuning Section and Set-Up Sheet to determine if your wing will mount high or low. There are two sets of holes in the tower (3313) for the wing mounts (3500). Here we have used the lower set of holes. Use four 4-40 X 1/2" cap head screws (6002). Team drivers pre-tap the wing mounts, but do NOT tap more than 1/4" into the mounts. Also, do NOT use longer bolts. The holes in the mounts are not very deep.





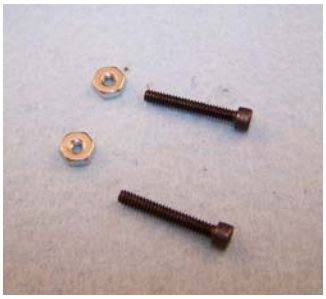
TEAM TIP: Team drivers often cut off the pip where the wing attaches to the mount, grinding it flat. Then they drill a hole down into the mount and attach the wing with a black X Factory # 6452 wheel washer and a flat head screw.

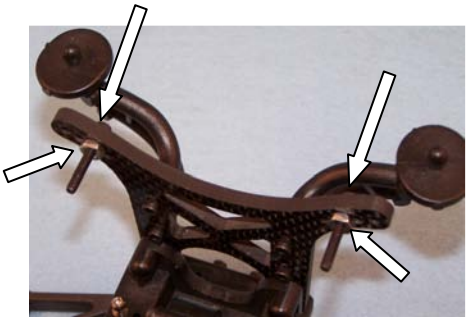
H2) Install the tower with wing mounts to the rear, using four 4-40 X 1/2" cap head screws (6002). In a few bulkheads, these screws have stripped when over-tightened, so keep the gorilla in his cage. Poor guy – we never let him out to play!



INSTALL THE SHOCKS

H3) Consult the Set-Up sheet and tuning Section to determine where you will mount the rear shocks. Here we are using the #2 hole. Install two 4-40 X 3/4" cap head bolts (6004) from the rear of the tower and secure with the two standard nuts (6070).



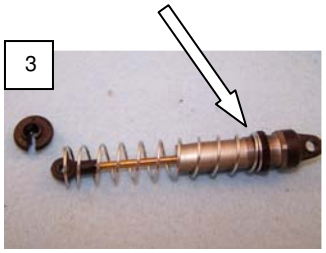


H4) Gather the shocks and spring cups. Pull the shock shafts out as far as they will go. We have supplied brown springs (ASC 6493) for the front and silver (ASC 6478) for the rear. Slide each spring up from the bottom until it engages the shock collar

1

2

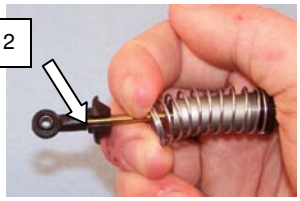
3



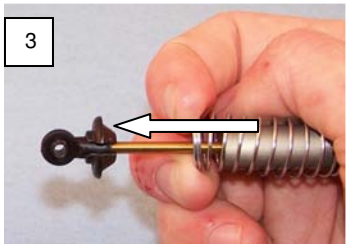
H5) Compress the spring toward the top of the shock, exposing the shaft. Place the spring cup (ASC 9606 & 9607) over the shaft above the shock bottom eyelet. The round side of the cup is toward the spring. Slide the cup down over the eyelet and release the spring. The spring should seat properly on the cup.

1

2



3



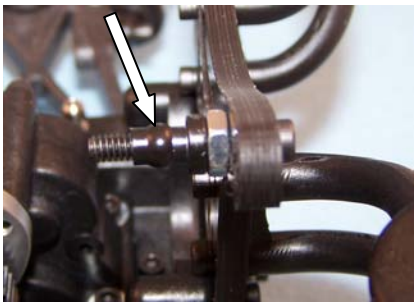
4

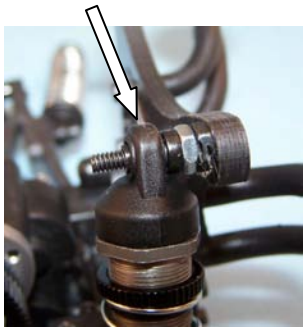
H6) Put the springs on all the shocks. Silver rear. Brown front.

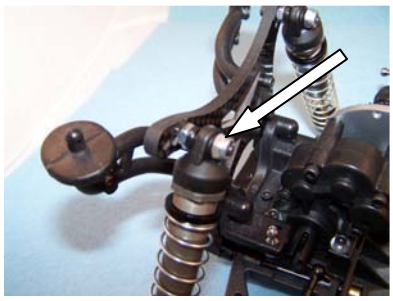
We will install the rear shocks first.

H7) Remove an upper shock mount tree (ASC 6473) from Bag H and cut the two bushings off. Team drivers dress the bushings for appearance. Also get out two #4 lock nuts (6071).

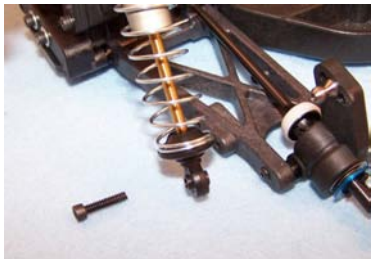
H8) Slide the bushings over the upper shock mounting bolts so they are up against the standard nuts. Slide the upper eye of the shock over the bolt and over the bushing and secure with a lock nut. We do the top first because you will want to rotate the shock out of the way so your nut driver will fit properly on the lock nut. Be certain the shock moves freely on its bushing.

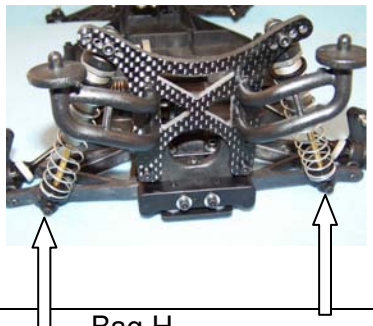






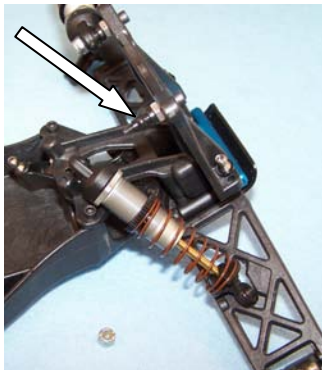
H9) Consult the Set-Up sheet and Tuning Section to determine where you will mount the bottom of your shocks. Insert a 4-40 X 1/2" cap head screw (6002) into the eyelet at the bottom of each shock and screw the shocks into the rear of the control arms. Here we have used hole #2 (middle).



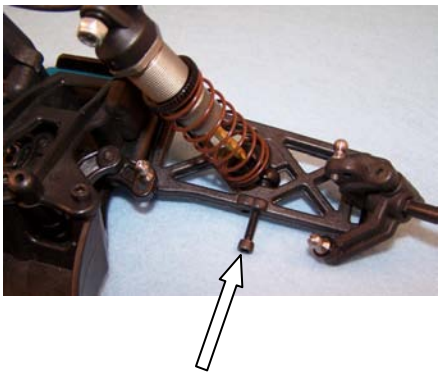


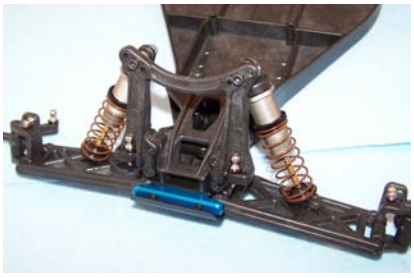
Now the fronts.

H10) Repeat the drill with the upper bushings and install them on the mounting bolts. Slide the upper eyelet of the shock over the mounting bolt and over the bushings, and secure with a #4 lock nut. Again, the shock should rotate freely.



H11) Consult the Set-Up sheet and Tuning Section to determine where you will place the lower shock mounts. Here we are using the #2 (outside) hole. Secure the shock with a 4-40 X 3/4" cap head screw (6004) through the lower shock eyelet.



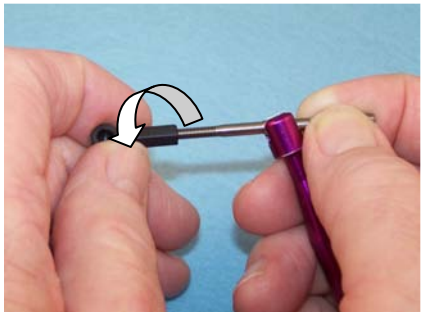


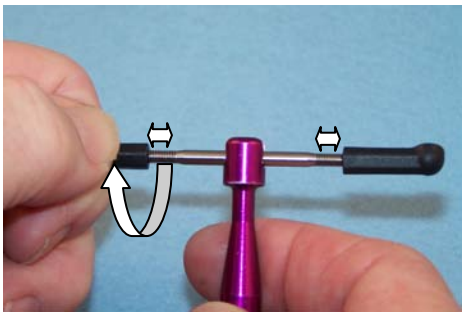
TURNBUCKLES

H12) WARNING/Tip From The Team: Do not use a pliers on the J Concepts ball cups! Not only must the gorilla stay in his cage, you must not even visit the zoo! Gripping the "cup" area will quickly render it useless, and gripping the hex area will pinch the ball cup so that it is difficult to screw the turnbuckle in.

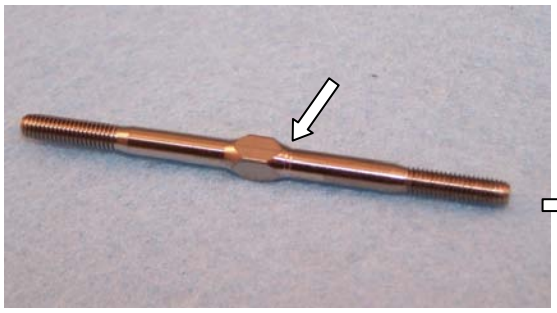
H13) Hold a turnbuckle with pliers or turnbuckle wrench and thread a ball cup (6120) onto one end with your hand. Turn the ball cup until it becomes too difficult, then thread a ball cup on the other end of the turnbuckle. Remember that one end of the turnbuckle is left-hand threads. You should try to have the same amount of turnbuckle threads protruding from the ball cup on each side of the turnbuckle – they should be even. Do this for all six turnbuckles.

.

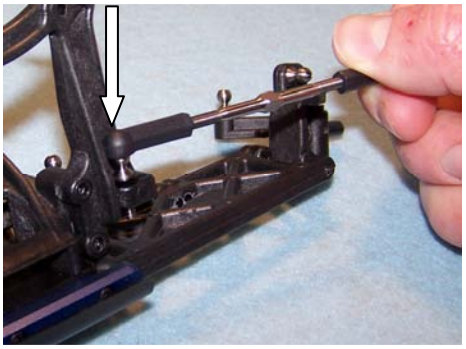


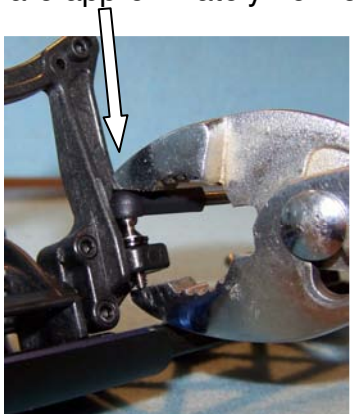


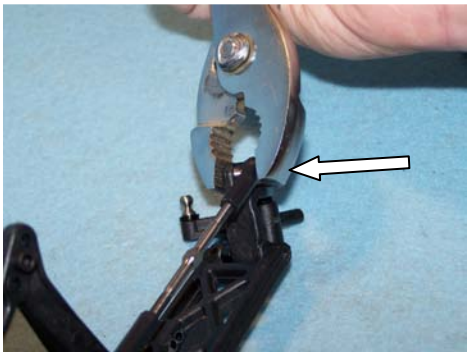
H14) You have four 2" Lunsford Ti turnbuckles (6111) and two 2 1/8" (6112). The steering tie rods are 2 1/8" and the four 2" are camber links. Just next to one side of the hex on each turnbuckle is a small groove that goes around the turnbuckle. (left photo) If all six turnbuckles are installed with the groove on the same side, groove to the left or groove to the right, they will all adjust in the same fashion. On the four camber link turnbuckles, the ball cups are 90^{o} opposed (top right photo), while the longer steering tie rod ball cups are in the same plane (bottom right photo).

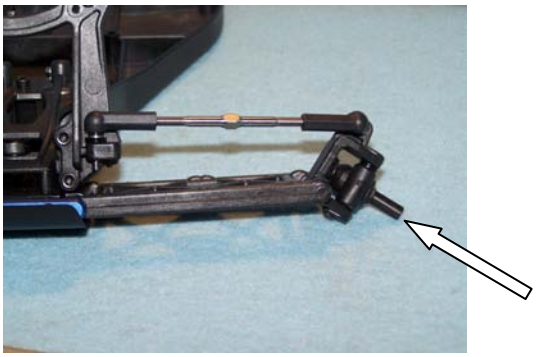


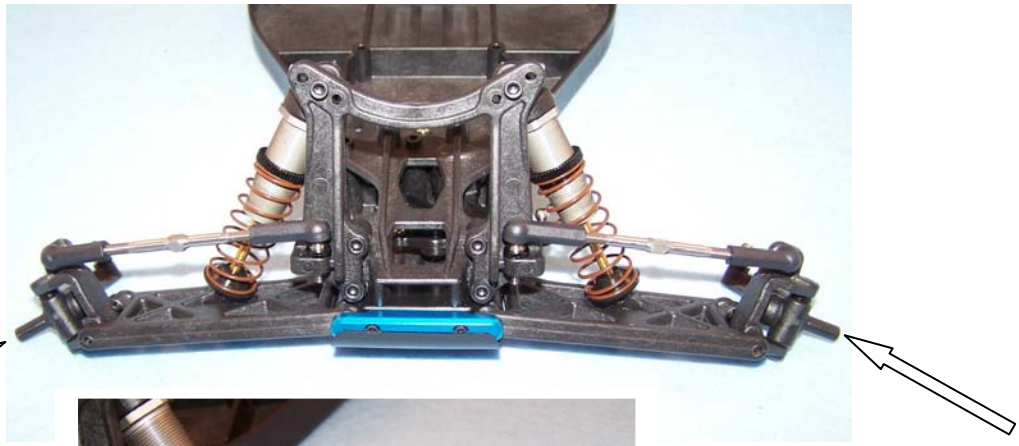
H15) Install the two front camber link turnbuckles by pressing the cups down over the ball studs. Sometimes a pliers helps. All the turnbuckles will be too long. Adjust the camber link turnbuckles so the front axles are approximately horizontal. Final adjustment will be made with the wheels on.

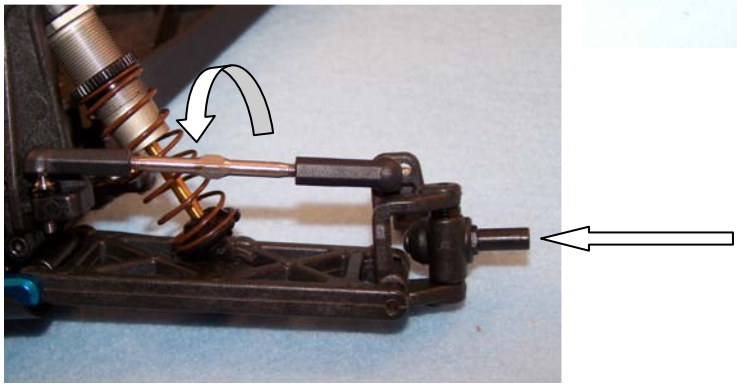




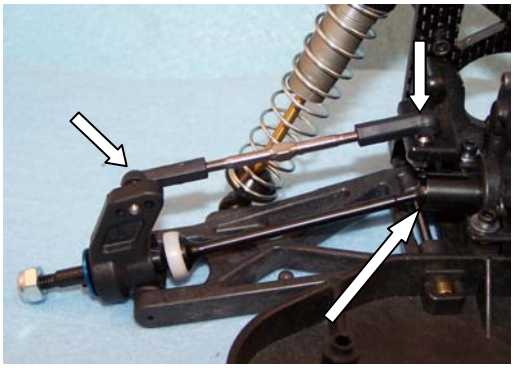


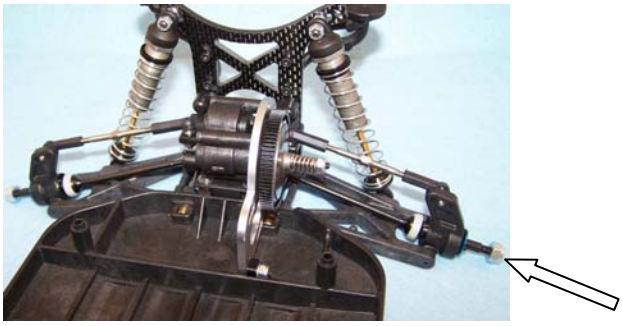




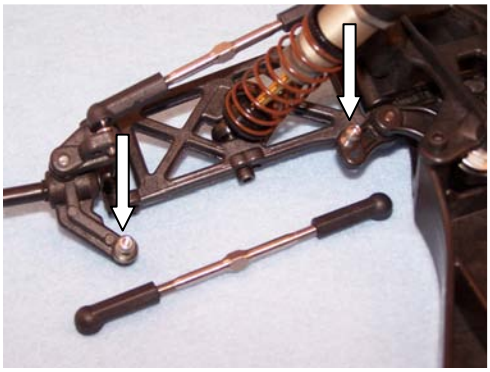


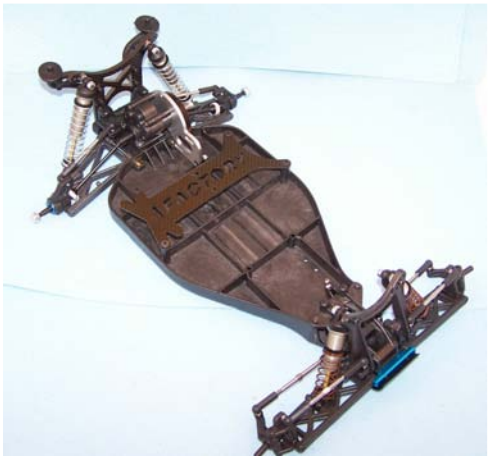
H16) In the rear, make sure the driveshafts are engaged in the diff outdrives (long arrow), then install the camber links by pressing the ball cups over the ball studs. (short arrows) Again, the hub carriers will be at crazy angles and you should adjust until the axles are approximately horizontal. Final adjustment will be made with the wheels on.





H17) Check the longer tie-rod turnbuckles to see that they are approximately the same length. Now install them to the steering rack and steering block by pressing the ball cups over the ball studs. Adjust until the axles are straight. Team drivers will carefully measure to be certain the two steering turnbuckles are the same length prior to installation. Final adjustment will be made with the wheels on.



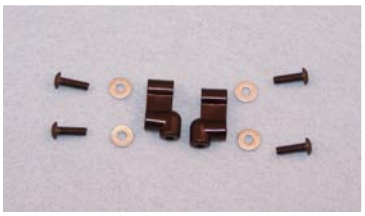


BAG I

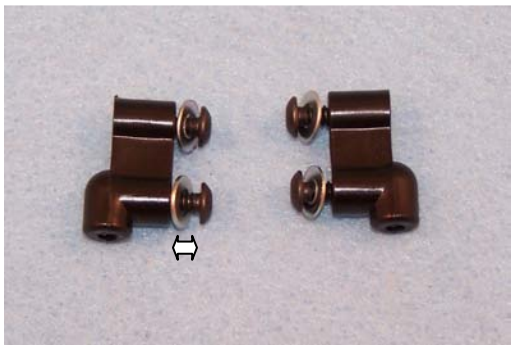
FINISH IT UP

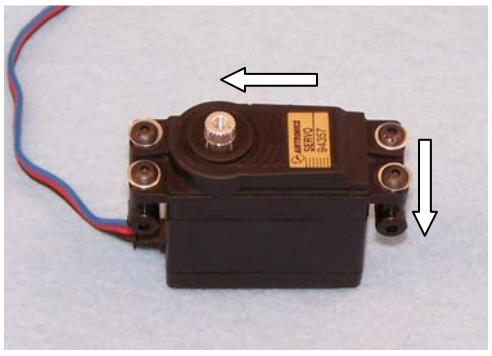
INSTALL THE SERVO

I1) Consult the Set-Up sheet and Tuning Section to determine if your servo will be in the forward or rear position. Remove the servo mount bag ASC 7336) from Bag I. It includes two servo mounts and the necessary bolts. There are also some spacers allowing fine adjustment of your servo position, though most Team drivers only use them to space the servo forward if it hits the chassis when trying to use the rear mounting holes.



I2) Install the servo mounts to your servo (servo not included) using the button head screws and washers included in the servo mount bag. We've found this easiest to do by threading the button head screws into the mounts slightly, sliding the mounts on to the servo tabs, and then finger tighten the screws. The mounts go under the mounting tabs; looking at the top of the servo, the mounts should face down while the output shaft is on the left.

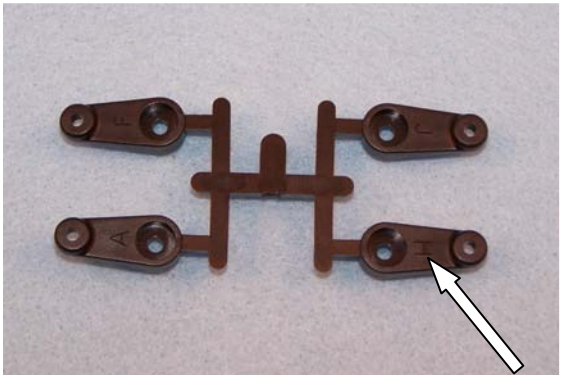




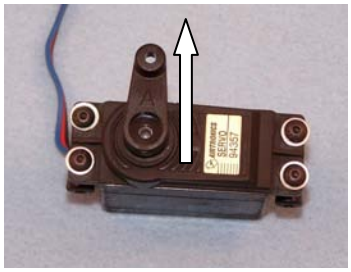
TEAM TIP: This is the easiest point at which to center your servo. The quickest way to do this is to plug the servo into another car, and power it on briefly. Alternatively, if you have the electronics you'll be installing in your X – 6 Squared handy, simply hook the battery, speed controller, receiver, and servo. Turn it on long enough for the servo to power up and center itself (and who can resist moving the transmitter just a little?). You'll do the fine adjustments once everything is installed in the car; this quick centering process gets the servo in the ballpark.

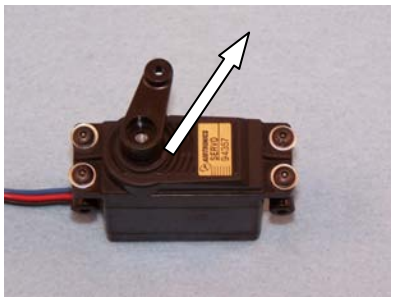
I3) Remove the servo horn tree (ASC 9180); notice each horn has a letter on it. Choose the horn appropriate for your servo:

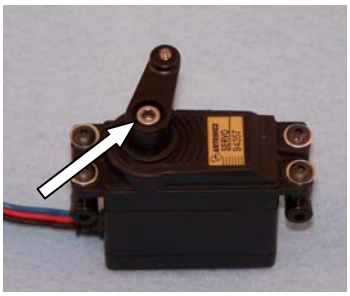
A – Airtronics/Sanwa
H – Hitec
J – JR and KO
F – Futaba



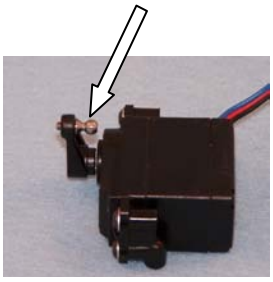
The only difference in the horns is the number of splines; if the horn seems unusually hard to install on your servo try a different horn. With the servo centered, put the horn on pointing straight up. (left) Carefully remove the horn and move it one spline to the right, or clockwise. (center) Secure the horn with the bolt included with your servo. (right)





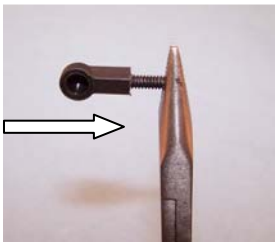


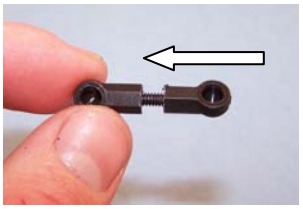
I4) Find the 3/16" ball stud (6170) in the hardware bag for installation in the servo horn. If you're installing the servo in the forward position, you'll want to put the ball stud in from the back, so it faces the servo (shown in these pictures). If the servo will be in the rear position, install the ball stud from the front of the servo horn.

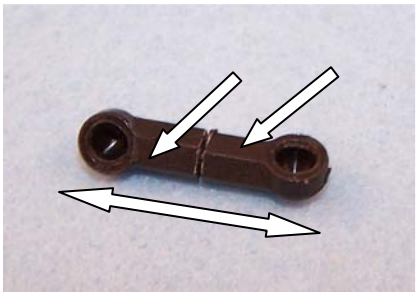


I5) Setting the servo aside for a moment, it's time to make the small drag link (ASC 9170) which connects the servo to the bellcrank system. Find the two small ball cups and the threaded rod. We recommend pre-tapping the two ball cups with a normal 4-40 screw to make installing the threaded rod easier, but don't let the gorilla over-do things.

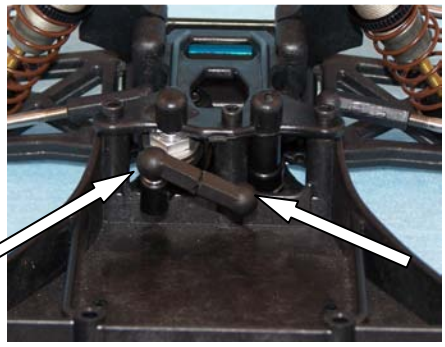
I6) Using some pliers to hold on to the threaded rod, screw one of the ball cups around half-way on. Screw the other small ball cup onto the other half of the threaded rod, and tighten it down toward the other. You'll want to orient the ball cups so they are 1/6th of a rotation from parallel; that is, the flats of each ball cup line up together, but the cups are one flat from being lined up. The overall length of the drag link (outside to outside) should be just over one inch (25.4 mm).



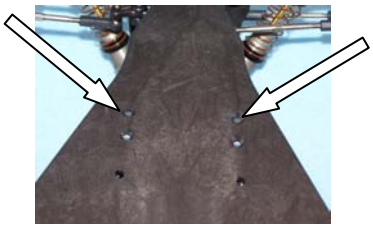




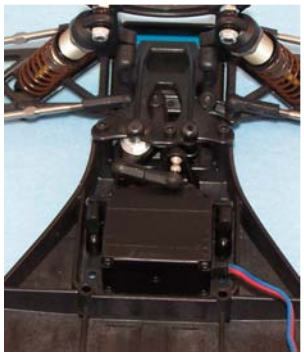
17) This step is easier with the servo out: pop one of the steering link ball cups on the left bellcrank/servo saver inside the car. We show the servo in the forward mount, so the drag link is oriented with the other cup facing the front of the car. If you'll be using the rear servo mount holes, the cup faces back.

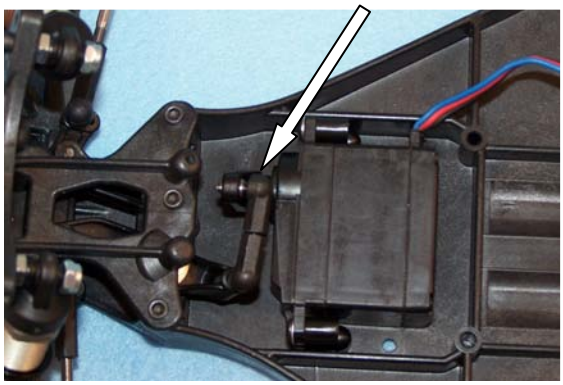


I8) Using the two 5/16” flathead screws (ASC 7336), install the servo on its mounts into the chassis. Once again, these photos show the forward servo mount. The screws come up through the chassis and thread into the holes in the servo mounts installed in step I2.



I9) Now carefully remove the servo, making sure not to move the servo mounts on the servo. Tighten the mounts, then re-install in the car. Now pop the ball cup on the servo horn ball cup.

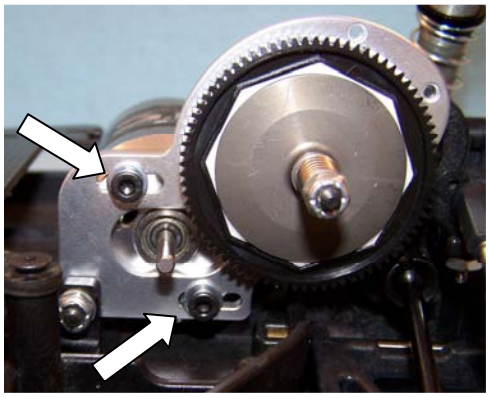


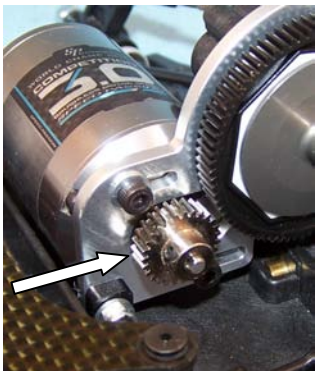


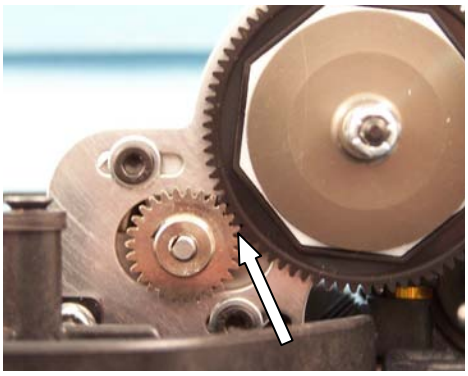
ELECTRONICS

I10) Install your motor (not included) using the two 3 x 6mm screws (6602) and washers (6080) included in Bag I. We’ve found it easiest to install the bottom screw first. Leave the motor screws finger tight. Install the pinion gear (not included) on the motor’s output shaft. Slide the motor toward the rear of the car to mesh the pinion with the spur gear and tighten the motor screws. Take care when setting the pinion/spur mesh; too loose and you risk damaging the spur gear, and too tight will cause binding and excess heat in the motor. The gears should be well engaged, but make sure you can rock the spur gear back and forth slightly in the teeth of the pinion gear. (photos next page)

.

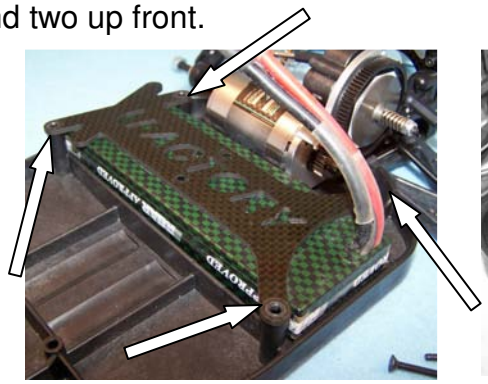


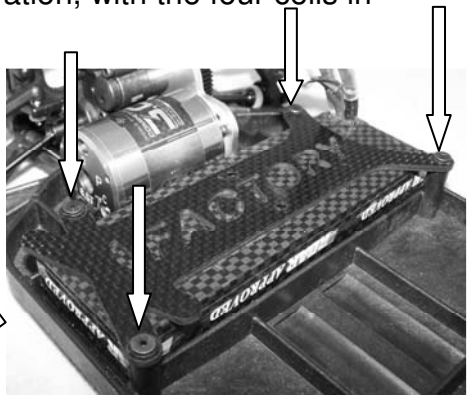




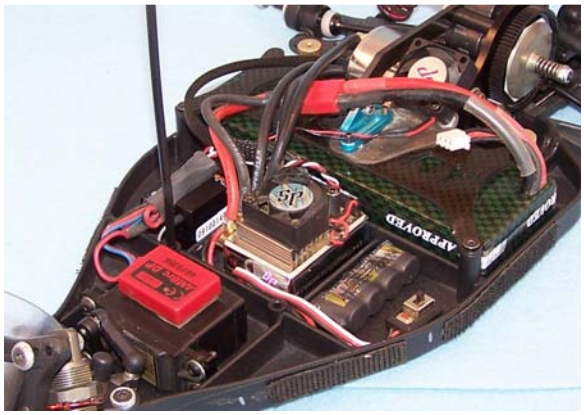
I11) Install the battery (not included) and X Factory CF battery strap (1223) using the 4-40 1" flat head screws (6028). With most LiPo batteries 4200 MAh and lower the battery strap will 'pop' onto the posts in the chassis and the screws will secure it. With extremely high-capacity packs, the battery strap may sit above the posts – this is OK, the flat head screws will help locate the strap over the battery and hold it securely. A few extra axle spacers (or the inner ball races from some old wheel bearings) would work well to space up to the strap.

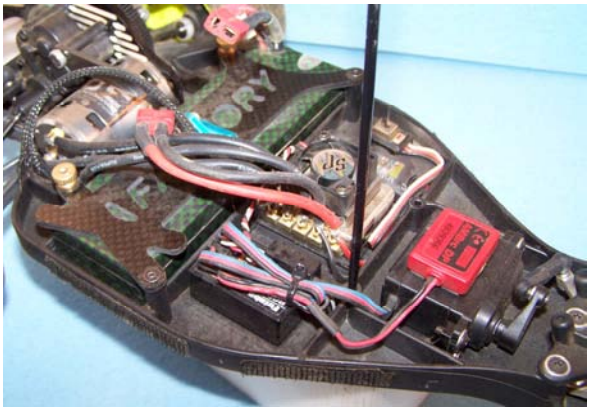
If you will use NiMh cells, you need part # XF 1224, a CF strap that fits on the same posts as the LiPo battery strap, but extends forward to hold the two cells in the forward bay. Make up your pack in a 4+2 configuration, with the four cells in front of the motor and two up front.





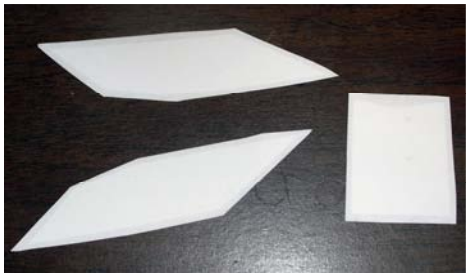
I12) If you are using Lipo, install the ESC (not included) using double-sided tape in the center of the chassis just ahead of the battery, and the receiver in one of the side bays. With NiMh, the ESC and receiver will each go in one side bay. There are two antenna mounts, so you can use the receiver on either side. A personal transponder fits nicely on top of the servo, or in one of the side bays. The layout pictured here is Paul Sinclair's car, showing an SMC 4100 battery, Speed Passion GT 2.0 Speedo, Competition 3.0 motor, a # DDP 023 Transmission Brace, and a fan mount made out of some extra lexan.

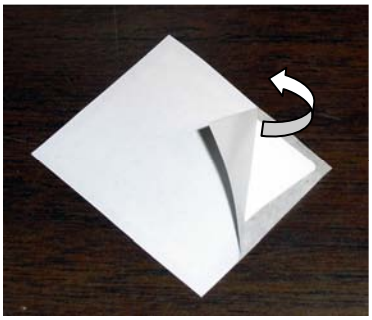




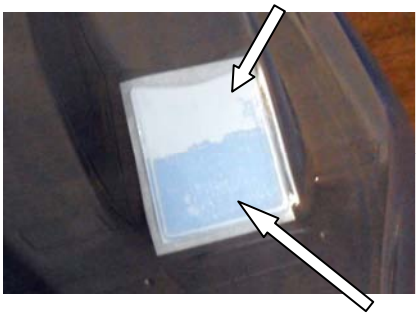
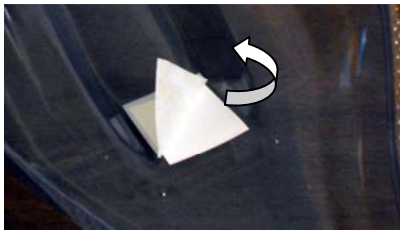
THE BEAUTIFUL BODY

I13) We've included some pretty awesome 2-piece window masks to make it easier to have a classy-looking paint job. They do take a little extra care to install. The first time we tried it – just trying to peel off the mask and stick it to the body – we messed it up. After several tries, we found this process best: First, clean the inside of the body (8021) with warm water and a gentle detergent. Cut each of the window mask pieces out by trimming close to the mask. No need be super-close, like a decal, just remove the excess. Then, carefully peel the opaque, white, stiffer backing off, leaving the window masks stuck on the more translucent, low-tack backing tape.

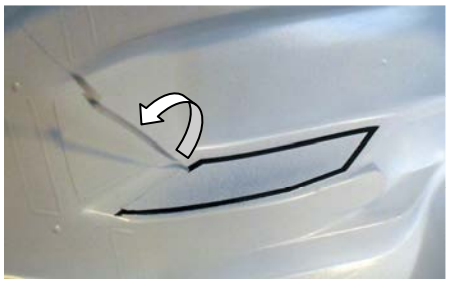


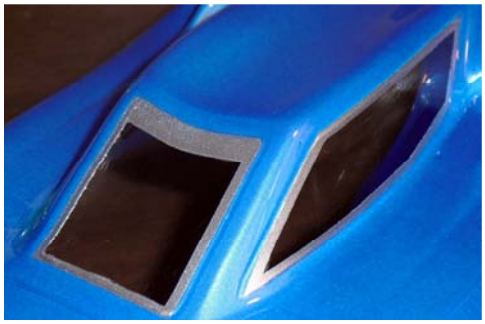


I14) Apply the window masks to the inside of the body, still attached to their low-tack backing tape. Line up the white masks with the window lines molded in the body. Once lined up, firmly press the masks to the lexan: they'll seem to turn from white to blue once fully pressed on. In the left photo below the lower part of the mask is fully pressed on (large arrow) and the top part of the mask has not been pressed firmly (small arrow). Finally peel off the backing tape, leaving the window masks on the inside of the body.

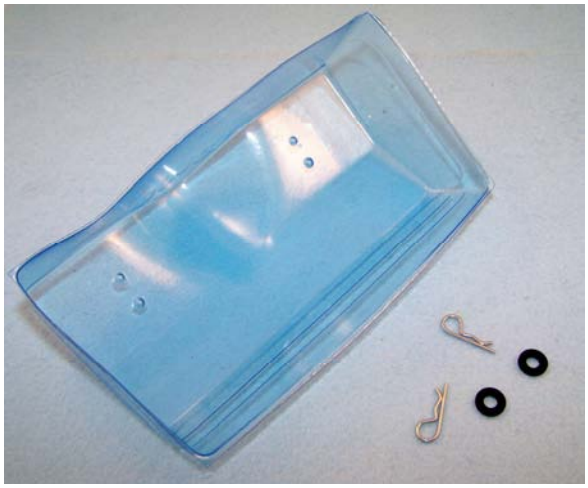




I15) After painting your dialed scheme, carefully peel off the outside surrounding edge of the window masks. This will give a nice even border around the windows to spray a quick color. Spray a backing color if you want, and once everything's finally dry peel off the main portion of each window. Remove the blue over-spray film from the outside of the body, and carefully trim the body along its cut lines. There are two lines along the bottom edges of the body; if you are running a larger LiPo battery you'll probably want to use the lower line, which raises the body up some and helps clear the battery posts. Use the supplied Velcro from Bag I on each side of the body and chassis to hold the body on the car.




I16) Cut out the wing; check the Tuning Section to determine what the various cut lines will do on the track. Cut two holes a bit less than 1/4" (5 mm) diameter on either set of dimple marks. The Tuning Section and Set-Up sheet will tell you which set of holes to use. Use the two black nylon wing washers (6311) and body clips (6310) to attach the wing to the wing mounts.



I15) Install the wheels and tires (not included). The rear wheel nuts are on the axles; the front wheel bearings (3/16" X 3/8" rubber sealed 6200) and 1/4" button head screws (6041) should be the last parts from Bag I.

Here is the beautiful X – 6 Squared of Team driver Yuichi Ajishi-san. Dialed!

Now, go through Paul's Final Set-Up & Prep section, then completely confuse yourself in the Tuning Section, and

LET'S GO RACING!!!

FINAL SET-UP AND PREP

ELECTRONICS

Now that the car is built and electronics installed, it's time to do the final set-up so the car runs straight and well. First, familiarize yourself with the set-up procedures of your various electronics: how to bind the receiver to the radio transmitter, how to set the speed controller to the radio, and how to adjust the steering settings on your transmitter.

Binding the receiver to your transmitter loads a unique identification number into your receiver, so it will only recognize your transmitter and not the others running at the same time. Each manufacturer has its own process for this. Even if this receiver was set-up previously, a re-do never hurts. Once the radio and receiver are talking together, set the ESC. Make sure the throttle and brake endpoints are at 100 on your transmitter and follow your ESC's guide. Again, there's no standard procedure across the board, but it generally involves entering a set-up mode on the ESC then modulating the throttle in a set way to 'teach' the ESC the radio's endpoints.

With all that out of the way, it's time to set the steering. First move the steering left and right, and make sure the wheels move the same direction. If not, you'll have to reverse the steering channel on your radio. Second, adjust the trim or sub-trim so that the steering rack is centered under the top plate. It's important to watch the steering rack, not the wheels, as different length tie-rods could throw off your center. You don't need to go berserk here with calipers and all, just use your eyes and get it close. Once the rack is centered, adjust your steering tie-rods so the wheels are approximately straight (0^o of toe).

The third steering setting to adjust is your steering end points, or EPA. Position some blocks or your car stand such that the front wheels can move freely but the front arms are 'level' (not at full extension). Turn the right endpoint waaaay down on your radio, and the turn the steering wheel or stick all the way to the right. Look at the steering block of the left wheel – you'll see a bump where it stops against the caster block. If it's touching right now, turn the end point down more. Then *slowly* turn up the right end point until the steering block just touches the caster block. Repeat this procedure for the left side. A lot of gorillas like to run their EPA so the servo is straining at full lock – this just causes excess load on the entire steering system, including your servo. Cage the gorilla in your radio; if you want more steering, adjust the setup!

BREAK IN THE DIFF

We're ready to run now, right?! Not Quite. The next thing to do is break in the differential. This is exceedingly important to the performance of your car and life of your diff. With the car all prepped as above, and a battery in and ready to go, get the car back on its stand, with the rear wheels off the ground. Turn on the transmitter and car, then adjust the trim on the throttle so that the motor begins running at a slow constant speed. You want this to be low enough that the tires don't expand at all. Using a block, the car stand, or something similar, stop the rotation of one of the rear tires. The other tire should continue to turn with the motor, nice and easy. Leave the car like this for two or three minutes.

By holding one outdrive/diff ring is held still, you force the balls in the diff gear to roll, slowly flattening the microscopic surface features of the diff ring and creating a smooth 'polish' where they will operate for the life of the diff. Too much throttle would cause the balls to just slip along the surface, grinding and wreaking havoc on the diff rings. Letting them run in slowly creates a nice mirror finish. After two or three minutes, switch the block from the one rear tire to the other, and let the motor run for another few minutes. Doing this procedure on the bench creates a much smoother and more consistent feel than trying to break the diff in on the track. Bring the throttle trim back to neutral to stop the rear wheels.

Now we'll set a starting point for diff adjustment. Turn everything off, hold the spur gear with your left hand, and give the right tire a light flick of the wrist. The tire will probably rotate 1.5 or 2 turns; you'll want to tighten the diff so with a similar input it only rotates once. Pop off the right rear turnbuckle, swing the hub and tire out of your way, and grab your 5/64" hex driver. The diff screw is on the right side of the car; slip the wrench into the head of the screw to hold the screw steady. Rotate the left rear wheel backwards slightly to tighten the diff. Pop the right side back together and 'feel' the diff again; adjust it in small increments so as not to over-tighten.

NEVER run the car with the diff that's slipping. If you hear the diff 'bark' or 'chirp' – kind of a screech sound usually out of corners or landing jumps – immediately stop running and tighten your diff (check your slipper setting too, but we'll get to that). Even in a race, is finishing a run really worth replacing the diff balls and rings before the next one? It's a quick adjustment now rather than a lengthy and expensive tear-down

RACE PREPARATION

The 5 Ps: *Proper Preparation Prevents Poor Performance*. You want a well-built car when you arrive at the track, but top drivers also have a routine before *every* run to make sure the car's settings are consistent each time out. This makes sure the car on the track is indeed what you wanted, and any performance difference is the result of deliberate changes. Here is a list of things we check each time the car hits the track, for practice or racing. It's meant to be a quick reference list; for a more comprehensive discussion of each setting check the Tuning Section. After a few times, the list should be routine and only take a few moments; you'll be rewarded with a car that's consistent, more responsive, and faster overall. Start with a car ready to run, body off.

1 – Check ride height. Find a flat and level surface; if you're going to use a gauge make sure the surface is hard, as a pit towel could throw off your readings. Check the front height, then the rear, and from the side take a look at the 'rake' of the car. Even little changes – anti-squat adjustment, shock mounting holes, different tires, etc – will change the ride height, so it's very important to check this every time the car hits the track.

2 – Look over your X – 6 Squared. This is easily done as you adjust ride height above. Just keep your eyes open as you go through the list. Feel the shocks, inspect the ballstuds, etc. You'd be amazed how many times we find a ballstud or shock nut working loose, or a loose/cracked part before a qualifier or race.

3 – Check camber front and rear. The one thing that can throw off camber measurements more than anything else is bent rims. If the top of your wheel wobbles in and out as you rotate the tire your rim is probably bent slightly. This isn't the end of the world; you don't have to replace the tire. Simply identify a spot between the extremes, rotate the tire so that point is on the top, and set your camber from there.

4 – Check the front Toe-in. Center the steering rack under the top plate, then look at the front wheels. If you don't have a toe-in gauge, stand up and look down at the front of the car for a better perspective.

5 – Set your slipper clutch and diff. We generally recommend the 'hold the rear tires and punch it' method: Turn the car and transmitter on, hold the rear wheels securely, and give the transmitter a quick burst of 100% throttle – don't be shy! You should hear a high-pitched whine as the front end lifts off your pit table; that's the slipper working. If the diff slips (a screech sound) stop immediately and tighten it a 1/4 turn or so. Back off the slipper and try again. Besides listening, watch the front end of your X – 6 Squared as you do this. The higher off the table your front tires get the tighter is your slipper.

TUNING SECTION

ABOUT ADJUSTMENTS

R/C race cars, in general, are some of the most adjustable racing machines of any scale. What's really amazing is just how easy and quick it is to make all of our changes: remove a ball stud to change roll center, one screw to change springs, or tape in some weight to change the car's distribution. On top of that, the X – 6 Squared is even more adjustable, adding options like the transmission height and the servo position that many other cars don't have. It's easy to get lost though, so here's some advice from one of the best in R/C racing, Brian Kinwald: "At any given track, only a few adjustments will help the car get around the track faster. 90% of set-up changes just alter how the car feels. The trick is to find those changes that really make a difference, and use the rest of them to get the car to suit your driving style." If you ever feel lost, like the car isn't working at all and you can't seem to get it back on track, change completely back to a standard set-up or something that worked previously and start again – it's how we learn!

When there are lap times available, pay attention to both your fastest lap and you consistency (how close the other fast laps are to the fastest one). If your fast lap is significantly quicker than average, work on making the car easier to drive; if you can run close to that fast lap the whole race, add some more steering or power and see if you can go faster.

Finally, don't be afraid to acknowledge if a set-up change didn't seem to affect the car on the track. Some adjustments are subtle, and different driving styles are sensitive to various adjustments. Learning that an adjustment didn't change much for you is a valuable result – focus on other things, and perhaps try it again later as your driving experience accumulates and set-up evolves.

DRIVING THE X – 6 SQUARED

The mid-motor X – 6 Squared is obviously a lot different than a rear-motor buggy, and it can take a bit of driving to get used to. With its weight more central the X – 6 Squared naturally caries more corner speed. With no "pendulum effect" from the motor hanging off the rear axle, the car likes taking smoother racing lines, while the rear end stays more planted. Watch out that you don't slam into the motor guards of other buggies through the infield!

The initial disadvantage of the mid-motor concept was a lack of forward bite out of corners, especially on slick tracks. X Factory designed the 4-gear transmission to help solve this problem: by turning the motor so it rotates in the same direction as the wheels, the motor itself helps transfer weight to the rear under acceleration, dramatically increasing forward bite. Further, the XF Team has put a lot of work into set-ups, developing cars that often have more rear bite than our competitors!

The starting set-ups in this manual have several features that add rear traction to help ease the transition to driving a mid-motor buggy. These include starting with the 4^{o} rear toe-in block, running the rear hubs all the way forward, and using 30^{o} front caster blocks. As you become more familiar with the car, you may find yourself surprised to be searching for steering. Read through the rest of this Tuning Section; check the set-ups posted by team drivers on our website, and feel free to post questions in the forum about your car. We love talking about this stuff!

TIRES

Tires are the most important tuning element by far: they're the car's only connection to the ground, and all other suspension or chassis changes must act through them. That said, tires are obviously very track- and condition-specific, so there's not much we can tell about them here. If you don't already have the right tires for your local tracks, see what the fast guys there are running. That's usually it.

SLIPPER AND DIFFERENTIAL

In previous sections we described breaking in your diff, adjusting it, and how to test your slipper clutch. Now, a few words about setting them! The diff and slipper can have a big impact on how your car corners and lays down the power.

The slipper clutch allows some 'give' in the driveline, which both protects the rest of the driveline from shock loads and takes the edge off the car in the high-torque range of the motor's rpm. Off the line and out of corners the slipper will slip some, just as its name implies, which helps prevent wheelspin and lets the car hook up. On slippery or looser tracks, we generally run a 'looser' slipper: back the nut off so that, when checking on the bench, the front end barely rises off the table. As traction comes up, you can tighten the slipper accordingly. On super high-bite surfaces, you'll actually back the slipper off some to prevent the car from pulling hard wheelies. The nice thing about slippers is the

ease of adjustment: have a friend take a ¼" wrench out to the track, and a few brief pit stops later you can have the car completely dialed.

Adjusting the differential for track performance is a tougher science, especially since the adjustment window is pretty small – less than full turn on the diff screw can go from too loose to locked up. The idea is, the looser your diff is, the more corner speed the car will carry. A tighter diff will have more forward bite – kind of like running a locked diff in a drag car. Diff adjustment isn't changed often but can be useful; always be sure the slipper gives before the differential barks.

FRONT CASTER

Your X – 6 Squared comes with 30° caster blocks. These give the car great corner entry steering while keeping it stable on exit. There are also 25° and 20° blocks available (ASC #9580 and #9592, respectively), which will progressively take away from turn in while adding exit steering. Honestly, the XF team worldwide runs the 30° blocks almost exclusively; there are usually better ways to gain steering without losing stability.

STEERING BLOCKS

One way to increase steering is to switch from the stock trailing axles to inline axles (ASC #9623) and inline steering blocks (ASC #9577). When you install these parts, move the spacer from behind the caster blocks (installed in step A9) to the front, and use the rear Ackerman hole in the steering rack. These axles will give much more aggressive steering in and out of the corner, though they sacrifice straight-line stability: they can make the steering feel twitchy. To combat this twitchy feel, many X Factory drivers have experimented with running the inline axles while leaving the caster blocks forward. This extends the car's wheelbase while taking some weight off the front tires, all of which smoothes out the car's steering.

ANTI-SQUAT

Rear anti-squat is the angle of the rear hinge pins relative to the ground. Lowering the rear toe-in block by removing spacers increases the amount of anti-squat in the car. With no spacers, the car has 4° of anti-squat; with approximately .120" (3 mm) of spacing the car has 0°, so every .030" (.74 mm) of spacers is a degree less. The thin white nylon shims included in the kit are .030"; the thicker ones are .060".

More anti-squat will generally take away rear side bite, add forward bite, and let the car spring more off jumps, generating a higher arc in the air. A car with more anti-squat will 'rotate' easier in sharp corners. Less anti-squat will make the car feel more stable and locked-in. Generally anti-squat is a "feel" adjustment, changing the way the car drives more than the fastest lap. It's another set-up change that's really quick and easy to do, so have a play with it and see what you like best.

REAR WHEELBASE

The wheelbase of your X – 6 Squared can be adjusted by moving the shims on the inner or outer rear hinge pins. As the pins are parallel to each other, moving the arm or the hub carrier by the same amount will have the same effect.

Moving the hub carrier forward increases rear traction in two ways: Primarily you are adding more 'angle' to the driveshaft, so there's more scrub between the dog bone and the outdrive as well as in the CVD joint. All this friction locks in the rear end and creates traction. Moving the hub carrier forward also increases the percentage of weight on the rear tires, further increasing bite.

Moving the hub carriers back is probably the easiest way to add steering and corner speed to the X – 6 Squared. It's one of the most commonly used adjustments for UK Champion Ellis Stafford. Moving the hub carrier or arm back some will increase steering throughout the corner. It also makes the car more stable in bumps, and because the driveshaft isn't as bound up, the car will "pop" better over jumps.

TRANSMISSION HEIGHT

The X – 6 Squared features X Factory's adjustable-height transmission. While not the easiest adjustment, it's a very powerful tuning tool to adapt the car to different surfaces. Included in Bag E (step E11) are several sets of transmission shims, four each of .030" (silver), .060" (gold), .090" (black), and .120" (green). Counting zero, that's five transmission height positions. When you change transmission height, make sure to re-check rear ride-height (remember the race preparation list?). Keeping the ride height the same will allow you to feel the isolated effect of the transmission height.

Important Note: For settings above .060", you'll want to shim up the motor plate support. We generally use #4 flat washers for this. Also, as you adjust the transmission height keep an eye on the driveshafts' position in the outdrive: use the small shims added in

step F11 to move the axles in and out, keeping the CVD engaged in the outdrive at full droop without bottoming out on compression.

Adjusting the height of the transmission changes several things at once. Primarily, it sets the distance between the inner hinge pins and outdrives; a greater distance allows the CVD to exert greater force on the suspension. It also changes the car's center of gravity slightly, as you're adjusting the height of the motor too.

Raising the transmission will give your car more forward bite. It effectively stiffens the rear of the car, which means the car will break loose sooner in corners and will bounce more over washboards or small bumps. A softer rear shock package is generally recommended when running the transmission high. Lowering the transmission does the opposite: less forward bite, but greater side bite and a smoother, more stable car over rough sections.

FRONT AND REAR TOE ADJUSTMENTS

Toe-in (or out) is the angle of the tires to parallel when viewed from above. Zero degrees of toe is when the tires are parallel to each other; toe-in is when the front of the tires point toward each other, and toe-out is when the front of the tires point away. Toe in the front of the car is very easily adjusted by turning the steering tie-rods between the steering rack and the steering blocks. The front tires are generally run with zero degrees of toe. Adding some toe-out will increase the initial steering in the car, but can feel twitchy and wander-y. Toe-in will stabilize the car, especially out of turns, but slows down the steering response and slightly decreases corner speed.

The rear tires are always run with toe-in, but the amount can be changed. It is adjusted by switching the rear pivot block (installed in step G8). More rear toe-in (the 4^{o} block) gives the car more forward traction but makes it harder to pivot the car. Less rear toe-in (the 3^{o} block) will let the car flow through corners and pivot well, but at a loss of stability off the line and out of corners.

CAMBER

Camber describes the angle of the tire from vertical when viewed from the front or back. If the top of the tire leans out past the bottom you have positive camber; if the tire leans in at the top it has negative camber. A good starting point is to have -1^{o} of camber all around; the team generally runs between 0 and -3^{o}. In general, more negative camber

will give more traction in the corners, while less gives more bite while the car is level. A good method of adjusting camber is actually watching tire wear or dirt build-up: if the tire looks even or uniform coming off the track, then you're close to spot-on.

RIDE HEIGHT

Ride height is how high the car sits off the ground at rest. Pick up the whole car and drop it from a height of 6 inches (15 cm) or so onto a flat surface, letting the shocks settle. To check ride height by eye, look at the molding seams in the middle of the control arms: are they parallel with the ground (called "level") or do they angle up or down? If the center of the car is lower than the hub carriers/caster blocks, so the arms angle up as they go out, that is referred to as 'below level', and vice-versa if they're angled down. If you have a ride-height gauge, touch off just behind the front bumper for the front and just under the transmission for the rear (the chassis will wear underneath the rear pivot block through the chassis life; measuring under the transmission will be more consistent).

The standard ride height is with the front arms level, or about 24 mm off the ground using a gauge (gauge measurement will vary based on the diameter of front tires); and the rear arms just below level, or roughly 23mm with similar considerations for tires. Raising the whole car up will add traction, feel better on rough tracks, and jump better. It also makes the car more prone to traction-rolls, though. When the traction comes up, it's better to lower the car some. This makes the car feel more direct, with faster reactions, and helps prevent roll-overs.

Check the car from the side using the same drop technique. This lets you see the "rake" of the chassis: the angle from front to back. In general you want to keep the car flat front-to-rear, or perhaps a touch higher in the back. Lowering one end of the car will give that end a little more grip, but extreme differences can make the car hard to control on the track.

CAMBER LINKS

Camber links are one of the more complicated adjustments on any R/C Car, and your X – 6 Squared is no different. The inside hole groups are referred to by numbers, and the outside holes are called by letter. The more inside the hole is, the lower the value. Thus a "2B" rear camber link is in the outside hole of the rear bulkhead (2) and the middle hole in the rear hub carrier (B); a "1A" link would be the inside holes in both.

Camber links adjust the car's roll centers – points critical to understanding how the suspension and chassis will roll through a corner. Without going through the geometry here, remember this: the shorter and more angled down the camber links are (inside lower than the outside), the higher the roll centers are. A higher roll center reacts more quickly but with less overall effect. Thus, removing washers or shortening links makes the car react more quickly but have less total roll. Adding washers or lengthening the link will slow down the reactions but make the car feel stiffer. Changing washers is generally a smaller effect than changing the length of the link. Remember:

Less washers (inside) = shorter link = higher roll center = more aggressive
More washers (inside) = longer link = lower roll center = slower, stiffer

If the above is the theoretical look at camber links, here's a more direct view: In the front, removing washers/shortening the link will quicken steering response but give the front less roll, leading to a possible mid-corner push, or steering which seems to wash out. A longer link will slow the reaction but give you more mid-corner steering. In the rear, removing washers/shortening the link means the back end will roll less and square up out of corners better. A longer link will give more rear traction in corners.

For a more systematic approach: Think about the outside ball studs first. The further out in the hub carrier or caster block you run, the more "square" that end of the car will run. This is especially felt in the rear: the 'C' hole in the rear hub carrier has more side bite in the corner, but when the car does break loose it will spin hard. The 'A' hole will let the rear end slide more, but it's much easier to control with throttle. The inside holes go through bumps a little better, too. Second, the inside ball stud location: the inside hole (longer links) will give more traction and feel safer while the outside hole is more aggressive. Last, find the number of ball stud washers you like: more washers will give that end of the car more corner traction but slow down its response.

A final note about camber links: keep an eye on the balance of the front and rear links. Having a short link up front and a long one in the back can make the car feel less confident and consistent. If you find yourself liking a long rear link, try a longer front one to go with it, and vice versa.

SHOCKS

The shock absorbers on your X – 6 Squared pack quite a lot of adjustment potential, and with good reason: they're working all the time, through corners, bumps and jumps, even just going straight! On your shocks you can change the spring rate, the damping and pack, mounting locations, and travel limits.

Changing the spring rate is pretty easy: change the springs. We've included the most commonly used springs worldwide to get you on the track; AE offers two shock spring kits, one for the front (ASC # 1581) and rear (# 1582), which will give you plenty of options. In general, stiffer springs will make the car feel more direct and jump a little better; they're suitable for high traction surfaces. Softer springs are better for bumpier surfaces, and can help generate traction on low-traction tracks. That holds true for each end of the car. Stiffer front springs will take away steering but can make it easier to drive, while soft springs add steering. Too soft will make the car hook spin out mid-corner. Stiff rear springs will add steering, especially in long sweepers, but at a loss of rear traction. Going softer in the rear will add bite, good on bumpy tracks, but take away steering.

The damping in your shocks is a combination of the pistons inside and the oil they travel through. Heavier damping (thicker shock oil) will make the car smoother on the track, and better landing jumps, but will make the car bouncy in bumpy or choppy sections. Lighter damping makes the car more reactive overall and better through bumps, but it will bottom out more jumping and be slightly harder to drive.

You should also consider the "pack" your shocks have. Due to fluid dynamics, the resistive force of our dampers greatly increases at high shock speeds. The smaller the shock piston holes, the more quickly the shock will pack and the greater the force will be. Big shock piston holes are the opposite. By adjusting the shock pistons and oil together, you can tune both the static damping and pack. To change the pack while leaving the static damping similar, adjust the oil 5 wt for each piston change. So if you started with #2 pistons and 30 wt oil, you could:

Increase pack with #3's and 25 wt
Decrease pack with #1's and 35 wt

and all three shocks would feel very similar on the bench (static damping). Increased pack is good over smooth tracks and very good for big jumps with flat landings; it also carries more corner speed. If your car is bottoming out hard landing jumps, try increasing pack in the rear. Less pack is good for bumpy sections, as the suspension can soak up high speed movement better.

Suspension travel is controlled by adding limiters inside and outside of the shock. Limiting inside the shock (where the oil goes) reduces the amount of downtravel in the suspension: how far down the arms can go. More downtravel (fewer limiters inside) is better for rough tracks, as it goes over bumps and lands jumps better. Less downtravel (more limiters) makes the car corner flatter, change directions quicker, and prevents traction rolls, all at the expense of rough-track handling. In the rear, make sure you limit

downtravel enough that the CVD's cannot pop out of the outdrives; especially when using the inside shock hole on the rear arm the X – 6 Squared has quite a bit of travel. Limiting uptravel (adding spacers outside the shock body) is rarely used, usually only in the rear to prevent the CVD bone from hitting the outdrive.

Finally, we discuss shock mounting. Changing the bottom shock mounts affects quite a lot: the further inside the shock is mounted on the arm the softer the suspension feels (because the wheel has longer lever arm on the shock) and the more travel you have. To keep downtravel the same, it's generally recommended to add .060" (1.5mm) of spacers inside the shock for every hole you move in on the arm (and take out spacers when you move out, obviously). Running the front shock on the inside hole will add low speed steering at the expense of stability. The more in the rear shock is mounted, the "safer" the car will feel around the track: it's softer and soaks up bumps better. Moving the rear shocks out on the arm will add steering and is generally recommended for high traction, smoother tracks.

The upper shock mounts are much easier: the shocktowers holes are designed in an arc so that the suspension travel doesn't change as much. Inclined shocks (mounted in on the tower) have a progressive feel to them. They're smoother around the track and provide more side bite. Vertical shocks have more forward bite and are better over jumps.

THAT BODY AND… WOW, IS THAT THE WING?

The body on the X – 6 Squared is definitely different than about anything else out there. While it gets mixed reactions at first, most of the family has grown to like it in time since the car was released. The body was certainly designed for function over form, and it performs it's function very well: creating rear traction. Take the body off for practice once – we're pretty sure you'll want it back on before completing a lap. There's emerging a market for aftermarket X – 6 Squared bodies, so if the body doesn't grow on you after a while shop around, there are some cool alternatives out there.

That monstrous wing for the rear of the car is that way for a reason: to develop the most rear traction of any car out there. And it's good at its job. Air comes off the body and hits that scoop behind the shocktower, and the wing is as wide as legally allowed. The key to such a big wing is that it's adjustable: you can always trim it down. Kind of hard to add lexan to a smaller one though...

There are several cut lines along the back of the wing to help you set the Gurney height (the vertical piece at the back, named after Dan Gurney, American F1 driver and team

owner). Obviously the higher cut line used the more force the wing develops. The downside is that the car loses steering and, more importantly, will begin to jump nose-up over larger jumps. If you experience this problem in the air, cut the wing down until the car flies correctly. At some tracks we've actually cut away some of the back angled section to get the downforce we wanted. Adding a front wing can also help balance the car in the air.

ASSOCIATED PARTS INCLUDED IN KIT

AE-6473	Bushings, Shock, Upper (Pkg of 4)
AE-6478	Springs, Rear, Silver (Pkg of 2)
AE-6493	Springs, Front, Brown (Pkg of 2)
AE-7336	Mount, Servo, Plastic
AE-7664	Gear, Diff
AE-7667	Outdrive, Right
AE-7668	Outdrive, Left
AE-7677	Kit, Diff Rebuild
AE-7933	Tube, Crush (2)
AE-9170	Link, Servo
AE-9180	Horns, Servo (4)
AE-9360	Gear, Idler
AE-9562	Bumper, Front
AE-9563	Bulkhead, Front
AE-9566	Plate, Top
AE-9568	Tower, Shock, Front
AE-9578	Control Arms, Front
AE-9581	Blocks, Steering, Trailing
AE-9593	Caster Blocks, 30 degree
AE-9603	Pad, Slipper
AE-9605	Spring, Slipper
AE-9606	Kit, Threaded Shock Front
AE-9607	Kit, Threaded Shock Rear
AE-9610	Hardware, Steering Servo Saver
AE-9622	Pins, Hinge, Outer & King Pins (6)
AE-9622	Pins, Hinge, Outer, King (1)
AE-9640	Bolts, Steering, Lt & Rt
AE-9652	Gear, Spur, 78T
AE-9657	Servo Saver Spring, Steering, FT
AE-9659	Steering Rack Assembly
AE-9665	Brace, Hinge Pin, Front, FT
AE-9730	Carrier, Hub, Rear (B44)

X-FACTORY PARTS INCLUDED IN KIT

XF-1006	Chassis, Plastic, X-6 Squared
XF-1130	Motor Plate Support Bracket, X - 6/60/6Sq
XF-1223	Battery Strap, CF, LiPo, X - 60/6Sq
XF-1232	Motor Plate, 4-Gear, X - 6/60/6Sq
XF-1310	Bulkhead, Rear, X - 6/60/6Sq
XF-2601	Axle, Steel, Front, X - 6, 6Sq, B4
XF-3012	Control Arm, Rear, Graphite, X - 6Sq
XF-3211	Toe-In Bars, 3 Deg, 2.350", X - 6/60/6Sq
XF-3211	Toe-In Bars, 4 Deg, 2.350", X - 6/60/6Sq
XF-3250	Bag Shims, Anti-Squat, 6 (2 @ .030" and 4 @ 0.060")
XF-3313	Tower, Shock, Rear, CF, X - 6s
XF-3500	Wing Mount, Right, X - 5/6/6Sq
XF-3500	Wing Mount, Left, X - 5/6/6Sq
XF-5001	Trans. Case, 4-Gear, X - 6/60/6Sq
XF-5201	Shaft, Idler, X - 6/60/6Sq
XF-5210	Shaft, Top, X – 6/60/6Sq B4/T4
XF-5530	Plate, Slipper, X – 6/60/6Sq B4/T4
XF-5700	Shims, Trans. Case, 16/pkg - 4 of each shim
DDP-025	Shims, Suspension, Alum, Black,
XF-5800	Kit, CVD, X – 6 Sq.
XF-6001	Screw, Cap Head, 4-40 x 3/8"
XF-6002	Screw, Cap Head, 4-40 x 1/2"
XF-6003	Screw, Cap Head, 4-40 x 5/8"
XF-6004	Screw, Cap Head, 4-40 x 3/4"
XF-6006	Screw, Cap Head, 4-40 x 1"
XF-6021	Screw, Flat Head, 4-40 x 1/4"
XF-6023	Screw, Flat Head, 4-40 x 1/2"
XF-6024	Screw, Flat Head, 4-40 x 5/8"
XF-6028	Screw, Flat Head, 4-40 x 1"
XF-6041	Screw, Button Head, 4-40 x 1/4"
XF-6043	Screw, Button Head, 4-40 X 1/2"

X-FACTORY PARTS INCLUDED IN KIT (Continued)

XF-6053	Screw, Button Head, 2-56 x 1/8”
XF-6055	Screw, Cap Head, 2-56, 5/16"
XF-6070	Nut, Standard 4-40
XF-6071	Nut, Nylock 4-40
XF-6074	Nut, Nylock, 5-40
XF-6080	Washer, Flat, #4
XF-6111	Turnbuckle, Lunsford "Punisher" Ti, 2"
XF-6112	Turnbuckle, Lunsford “Punisher” Ti, 2-1/8”
XF-6120	Ball Cups (12)
XF-6141	Hinge Pin, 2.350", Ti, X - 6/60/6Sq
XF-6142	Bushing, Hinge Pin, Brass, X - 60/6Sq
XF-6170	Ball stud, Lunsford Ti, Broached, 3/16”
XF-6171	Ball stud, Lunsford Ti, Broached, 1/4"
XF-6172	Ball stud, Lunsford Ti, Broached, 3/8”
XF-6200	Bearing, Rubber Shield, 3/16” x 3/8”
XF-6202	Bearing, Metal Shield, 3/8” x 3/16”
XF-6203	Bearing, Rubber Shield, 3/8” x 5/8”
XF-6204	Bearing, Metal Shield, 5/32” x 5/16”
XF-6205	Bearing, Metal Shield, 1/8” x 1/4”
XF-6206	Bearing, Rubber Shield, 1/4” x 1/2”
XF-6300	Bag, Threaded Inserts (2 @ 3/8” and 4 @ 1/2”)
XF-6310	Body Clip
XF-6311	Washers, Wing
XF-6450	Shim, 3/16”, .010”
XF-6451	Washer, Wheel, 3/16” X 1/2" X 0.079”, Silver
XF-6500	Diff Balls, Carbide, 3/32” (12)
XF-6602	Screw, Cap, 3x6 mm
XF-8021	Body, X - 6 Sq, with Wing and Window Mask
XF-8238	Decals, X-6 Sq
XF-8300	Velcro

X Factory Family at 2010 Cactus Classic

Left to right: Paul Sinclair, Paul Caroll, Alex Krieg, Zack Genova, Brian Kinwald, Chris Cristo, Travis Travisimo, Brad Blankenship, Chance Chapel, Clayton Easley.
That's Zack's SCX-60 in the center, hand made by Speedy Dad, who took the photo.

Brian Kinwald and his X – 6 Squared from the 2010 Cactus Classic.