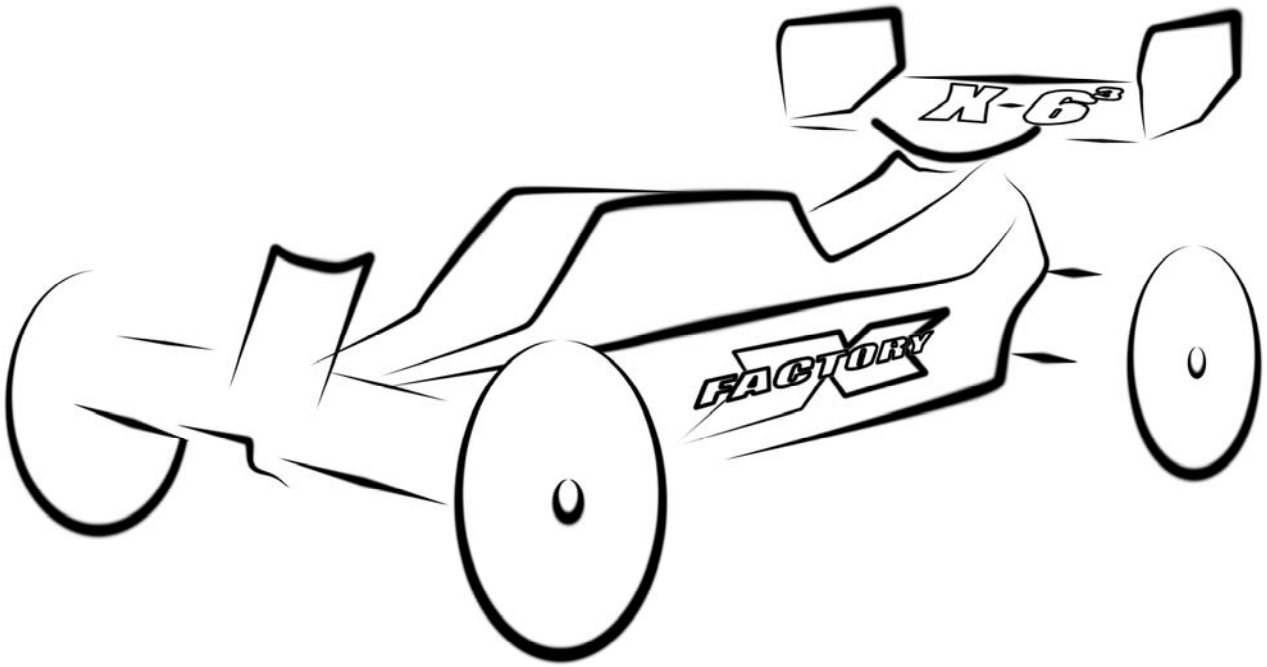
X – 6 CUBED

K 030 CONVERSION KIT

INSTRUCTION MANUAL

Version 1.0



X – 6 CUBED CONVERSION KIT

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X – 6 CUBED 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.
3. You have a Team Associated B 4, 4.1, or 4.2 rolling chassis..

If you do not meet all the assumptions above, please contact us immediately. Contact information is on Page 5.

WE WANT YOU TO HAVE A PLEASANT EXPERIENCE BUILDING THIS KIT, AND HOPE YOU HAVE MANY PLEASURABLE DAYS DRIVING YOUR NEW X – 6 Cubed. Please contact us with the slightest problem. We want to help. Talking with the Family is so much more fun than work.

B) We suggest you have a clean, well-lit work area with enough space to simultaneously do three things: Work on the car; Store sub-assemblies for later use; Store parts no longer needed.

C) Before threading screws into any plastic part, tap holes with a 4-40 tap.

D) Many drivers use thread locking fluid when mounting aluminum parts to the CF chassis. Others do not, and make a ritual of checking these screws after every run. Take your pick, but be consistent.

E) You will want to re-build many components, for example shocks, or take apart some assemblies for inspection and cleaning. We include no instructions for this – refer to your AE manual.

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

G) Throughout this manual the names of many parts are followed by a number in parenthesis. This is the X Factory or AE part number.

H) The words and photos in this manual refer to a B 4.2. Some things are slightly different on a B4 or 4.1; but the differences are slight and these instructions should take you easily through Converting those cars.

CARE AND FEEDING OF CARBON FIBER

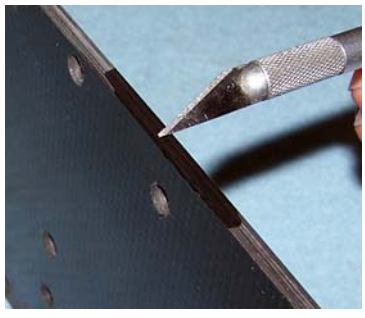
Throughout your Kit we have deliberately cut the bolt holes in the CF parts on the small side for a good tight fit. Thread them up through and then give an extra twist or two so they will be snug but free.

Carbon fiber is a laminate, much like plywood, and is produced similar to laying up fiberglass. While the material is extremely strong and light, without proper attention it can begin to delaminate, leaving a “frayed” appearance around the edges. All carbon fiber parts used in your SCX – 60CF have been CNC machine cut from flat sheets, so the edges are unfinished.

In a well ventilated area we suggest you run some fine-grit emery cloth or sand paper around the edge of all your new carbon fiber pieces. Wear a dust mask while you sand. Then, blow off the dust and run a small bead of C.A. glue, the same stuff you use to glue tires, around the edge. Spread the glue out with a hobby knife so it covers the entire edge of the part, but don’t let any drip on the shiny front or back of the part. A little dab’ll do ya. This will seal the edges.

Every few weekends take a look at the carbon fiber parts and, if any fraying appears, sand and glue to keep it to a minimum. Your CF parts will last many years.

Some drivers who race on abrasive surfaces use a protective film under their chassis to keep that carbon fiber looking great.



SOME IMPORTANT INFORMATION

We are not perfect. If you experience the slightest difficulty assembling your X – 6 Cubed, either because a part does not fit properly or because you have difficulty with the instructions, please contact us immediately. Even if you figure out what needs to be done, or make a modification that allows the part to fit, we want to make changes that help the next person.

You are much more than a customer at X Factory. You have become a member of a world-wide Family of R/C racing enthusiasts who love working on their cars, trying new things, and helping others at the track. We communicate with our Family constantly, and the Family gives us ideas every day for new products and improvements on existing products. We welcome and encourage this input. Thanks in advance for your help!

Contact us by:

Web Site: www.XFactoryRC.com
FaceBook: www.facebook.com/XFactoryRC

E-Mail: youngchazz@gmail.com

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

Phone: 419-887-1787 (USA)

Some bags are assembled at NorWesco Industries, Tiffin, Ohio.

Some photos credit: Steve Archer. Kit body paint: Mark Sameulson

These instructions are available on our web site, www.xfactoryrc.com . The photos are in color. In many instances, the color photos on the web are better than the black and white in this printed manual.

THANK YOU FOR YOUR
CONFIDENCE IN THE X – 6 Cubed!

Chief Engineer
Paul Sinclair.

WELCOME TO THE

X FACTORY FAMILY!

X – 6 CUBED INSTRUCTIONS

B 4.2 DISASSEMBLY

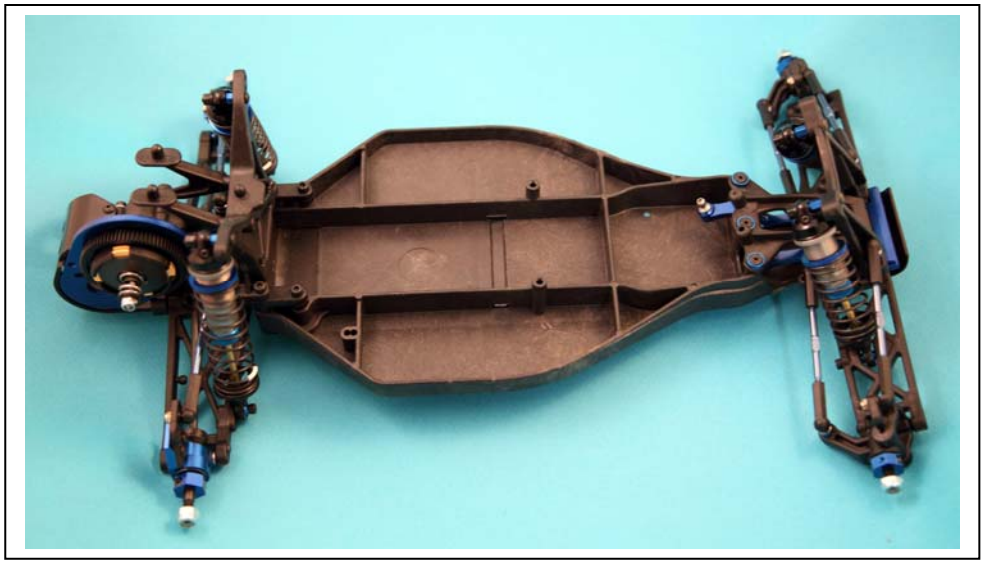
GENERAL

1) You are too experienced to require photos for these first few instructions. Remove the body. We suggest you store the clips by putting them back in the body mounts. Remove the wheels. Again, store the nuts by putting them back on the axles. We store things this way often so they are right where we need them when we are looking for them.

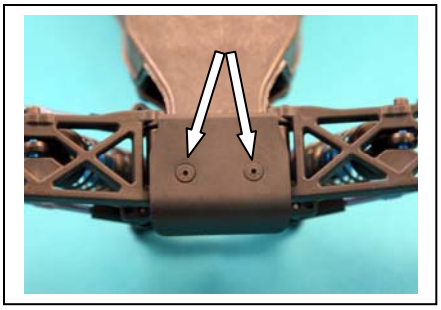
2) Remove the gear cover. You will not need this part or the screws. Take the pinion off the motor, then unsolder and remove the motor. Of course you'll need these parts again, so we suggest you put the pinion with your other pinions and put the screws back in the motor for storage.

3) Remove the electronics, including the battery, servo, E.S.C., radio receiver, and antenna. Save them all for re-use. Do not remove the servo mounts from the servo, just remove the two flat head screws from under the chassis and save those screws by putting them back into the servo mounts. Disconnect the servo link from the bellcrank, leaving it attached to the servo horn. Do not disconnect the horn from the servo. We suggest you clean the servo tape from the electronics.

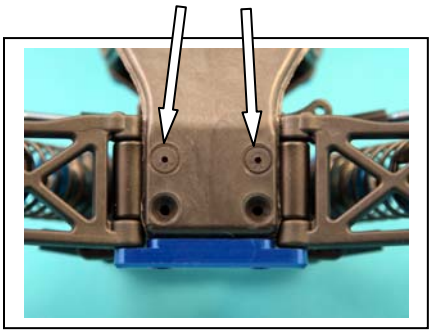
You should now have a rolling chassis as in this photo:



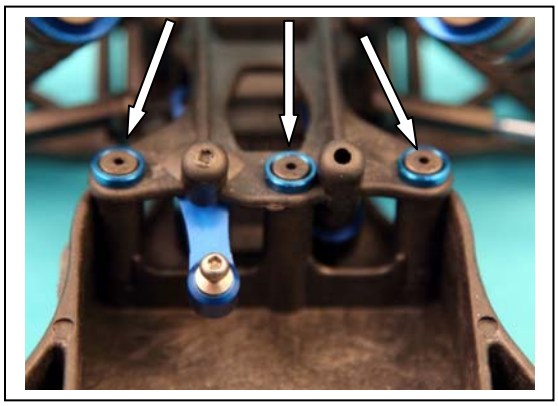
4) From beneath the chassis, remove the two flat head screws which hold the bumper to the chassis & bulkhead. Save the bumper and screws for re-use.



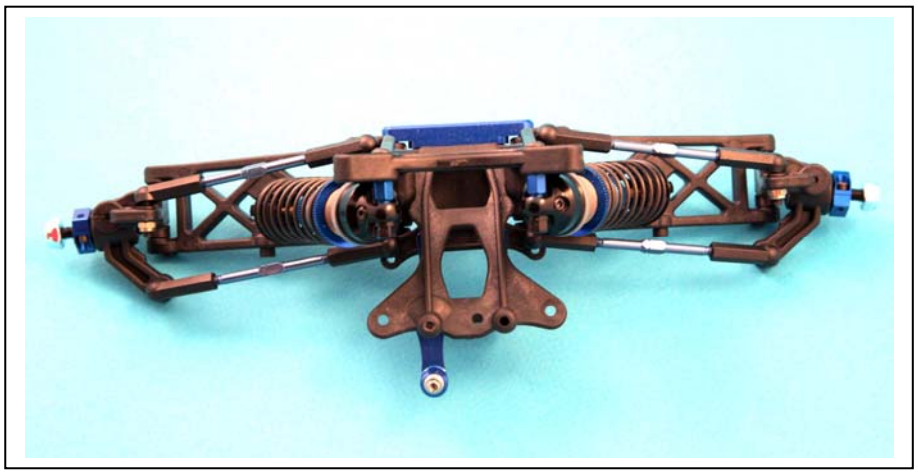
5) Still working beneath the chassis, remove the two flat head screws which hold the bulkhead to the chassis. Save these screws for re-use.



6) From the top, remove the three screws and washers that hold the top plate to the chassis. Save the screws for re-use.



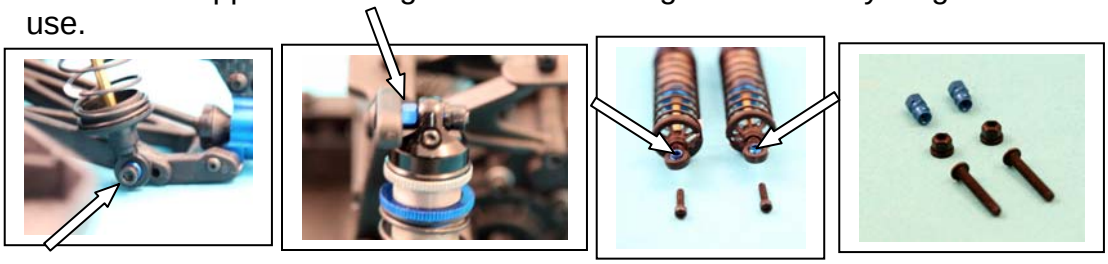
7) Carefully remove the front suspension and steering assembly and set it aside for re-use. Make sure the steering linkage stays in place.



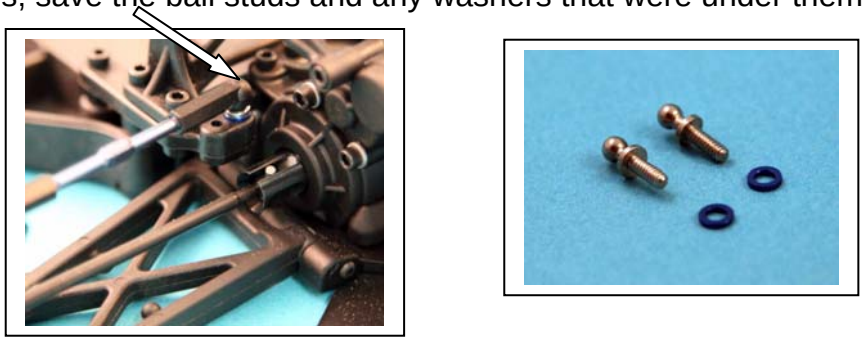
Front end is done! Let's do the driveline.

C.V.D.S & HUB CARRIERS

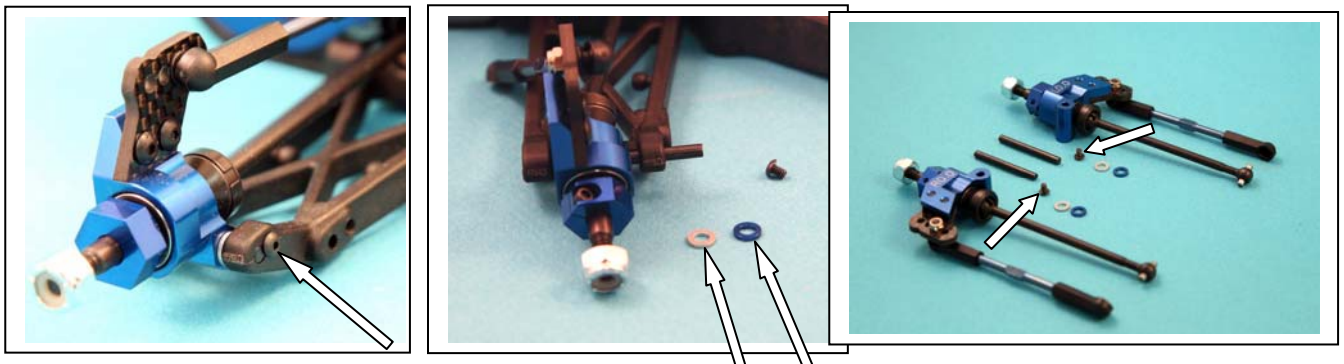
8) Remove the rear shock assemblies. From each side, take out the bottom bolt, then remove the plastic nut from the top. Save shocks and their bolts & nuts. Don't lose the aluminum bushing in the bottom shock eyelet! Now remove the upper mounting bolts and bushings. Save everything for re-use.



9) Twist the camber link inner ball cups off their ball studs, then remove the ball studs. Leave the cups on the camber links and the links on the hub carriers; save the ball studs and any washers that were under them.

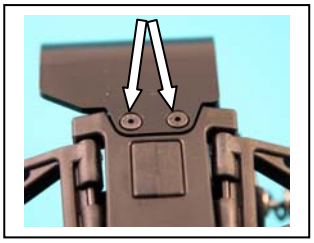


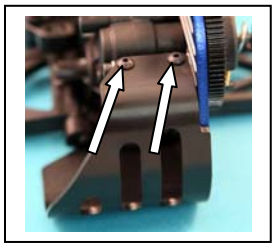
10) Remove the rear hub carriers with the C.V.D. assemblies still in them and the camber links attached to the hubs. Do this by removing the tiny 2-56 button head screw (left photo) and pushing the hinge pin out with an Allen driver. Careful not to lose the shims on the hinge pins! (center photo) Save these entire assemblies for re-use: The hub carriers, shims, hinge pins, and especially those pesky little screws. (right photo)



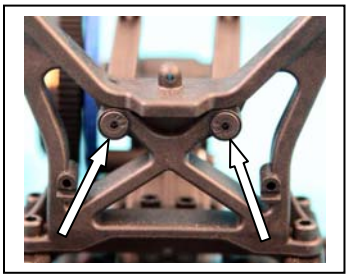
TRANSMISSION

11) Remove the gear cover. Two flat head screws from the bottom and two button heads from the top. Save the flat head screws for Inst. # E14 and the button heads for # F7.

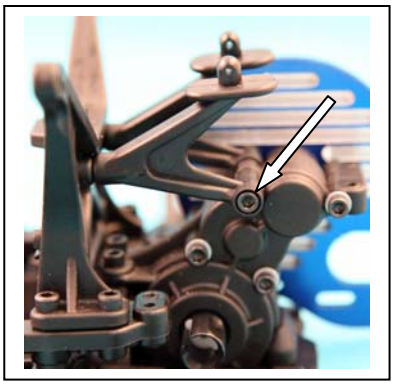




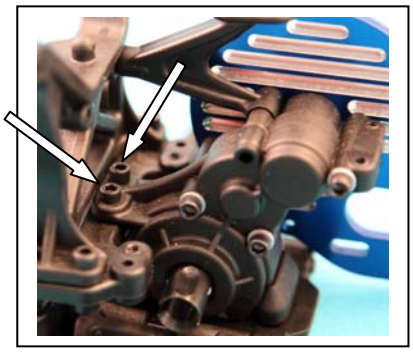
12) Remove the two 5/8" flat head screws that hold the wing mounts to the shock tower and save the screws for Inst. # B1.

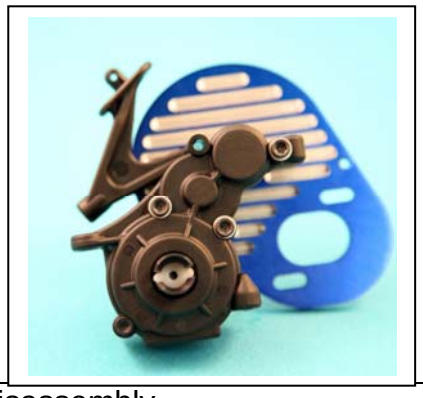


13) Remove the long bolt that holds the wing mounts to the transmission. This bolt will not be used. Remove the left wing mount.

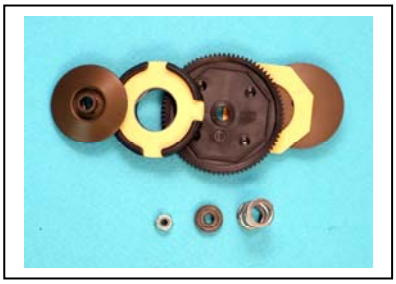


14) Remove the two bolts holding the transmission in the car. Save these 3/8" cap heads for Inst. # D 7 . The transmission should lift out now.

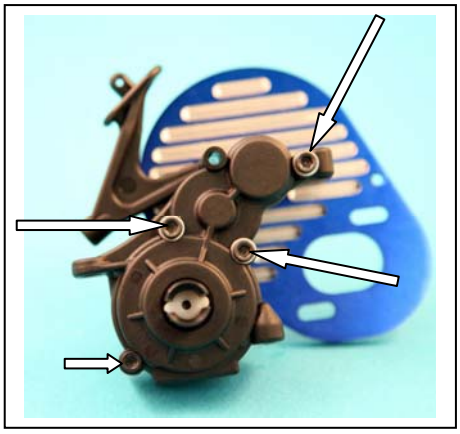


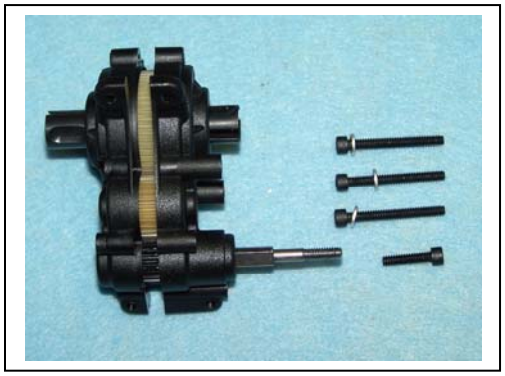


15) Remove the 5-40 nut which secures the slipper assembly, and pull off the nut, spring retainer, spring, outer slipper plate, slipper housing assembly with pads, spur gear, inner slipper pad, and inner slipper plate. All slipper parts will be re-used.

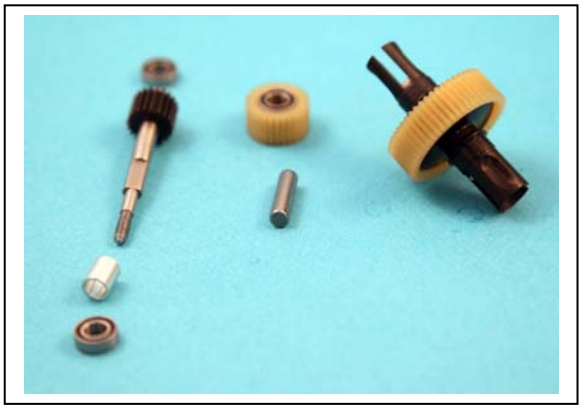


16) Remove the three long cap head screws (long arrows) from the transmission and take off the motor plate and wing mount. Then remove the last shorter cap head screw (short arrow), and separate the transmission case halves. You may discard the motor plate and wing mount; save the long bolts and washers for re-use in Inst. A23 and the 1/2" cap head for Inst # D5.





17) Remove the transmission components. The case will not be needed, but you will need the top shaft and spacer, two 3/16" X 3/8" bearings, idler gear with its two 3/16" X 3/8" bearings and shaft, and the differential assembly. The outdrive bearings will not be retained.



OK. Everything you'll need is off the B 4.

Now let's build carbon fiber goodness.

BAG A

TRANSMISSION

BALL DIFFERENTIAL

The B 4.2 and 4.1 diff uses metric outdrives and the X Factory 4-Gear transmission uses U.S. measurement, so we'll re-build the whole thing now.
If your donor truck is a B4, you have the U.S. sized outdrives & bearings. They fit the 4-Gear.

A1) Hold the outdrive with the T-nut (AE6575) in one hand and insert the Allen driver through the white protector cap (AE6575) and into the head of the diff thrust bolt (AE6573). Unscrew the bolt. Use the T-nut to push the bolt through the diff and out. The white cap will come with it; set it aside for re-use. Make sure the thrust bearing stays on the diff bolt – and don't lose any of the six little balls! Take the thrust balls (AE6574) and washers (AE6573) off the bolt. Clean the balls, washers, and bolt, and set them all aside with the cap

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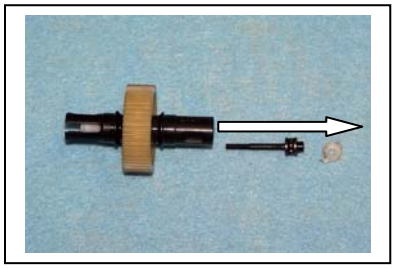
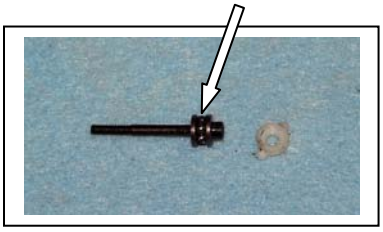
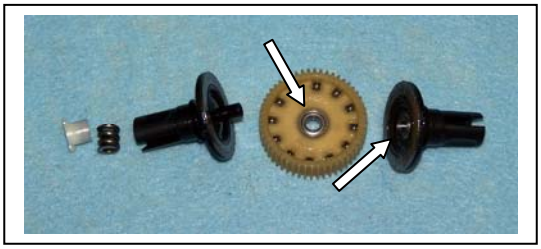


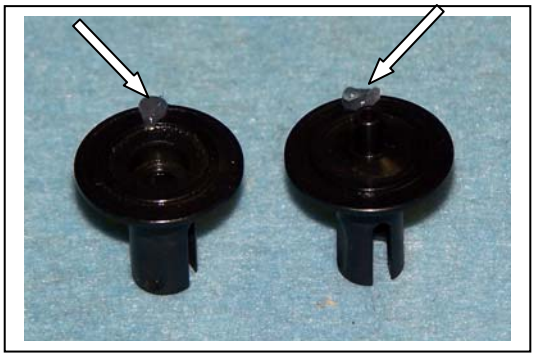


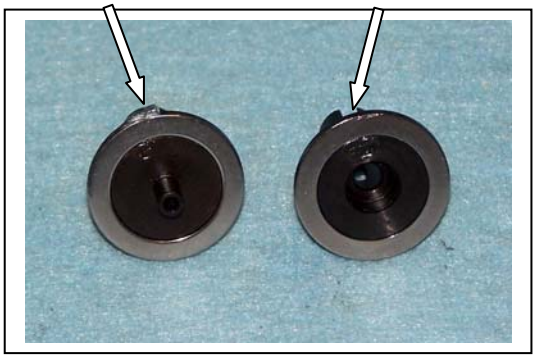
A2) Take the rest of the diff apart. Be sure to remove the T-nut and spring (AE6582) from the male outdrive. One diff bearing (XF 6204) should stay in the diff gear. The other may fall out or it may stay in the female outdrive.



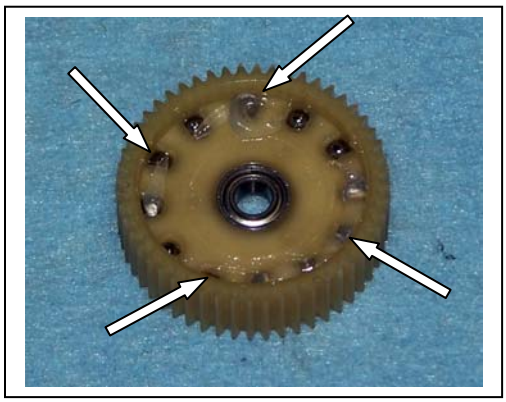
A3) Remove the 12 diff balls (XF6500) and bearing from the gear (AE7664). Clean the balls and gear and set them aside to air dry. Clean and re-lube the two diff bearings, using just a drop of good bearing oil. Set the spring and T-nut aside with the gear, balls, and bearings. This leaves the outdrives in front of you. Remove the diff rings and clean them. Our second diff bearing wanted to stay in the outdrive, so we removed it now. The rings will be used in step A4 below. Metric outdrives can be discarded.

A4) Check your diff rings for wear. If they're not new, there will be a thin line on the face of each one where the balls run. Darker line = more wear. You can use both sides of the rings, so if one side has not been used, flip them over. Carbide diff balls like X Factory's #6500 are much harder than the rings, so one set of balls should last through several sets of rings. Many X Factory drivers prefer B Fast diff rings for smoother, longer-lasting diffs. Take the new outdrives (AE7667 & 7668) from Bag A and on each one put a small drop of diff lube on one part of the edge where the ring will go (left photo). This grease does not lubricate, it merely holds the ring on during assembly. Grease attracts dirt (bad) so use as little as possible here. Wipe off any excess grease (right photo).

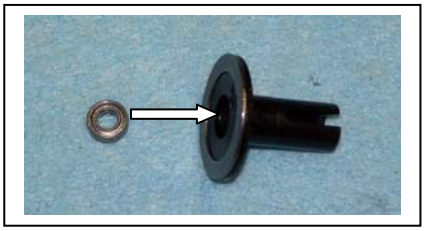




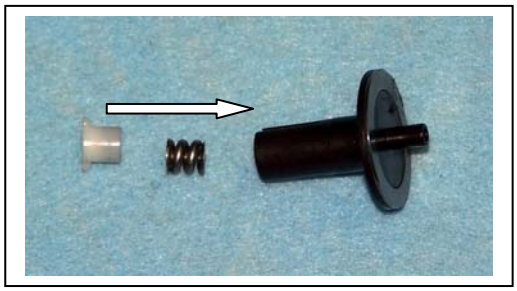
A5) Re-install the diff balls and one diff bearing into the diff gear. Put a small amount of diff lube on one side of each of the balls. We used too much in the photo so you can see the lube. You need surprisingly little lube, and excess is just thrown off inside the transmission case. Many X Factory Team drivers use B-Fast Pro Lube.



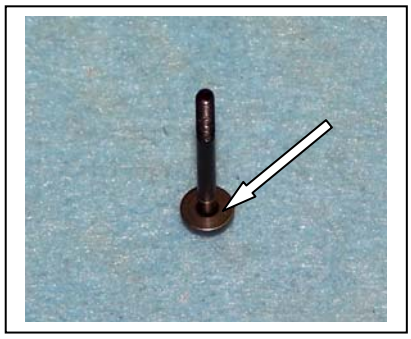
A6) Install the second diff bearing into the female outdrive.

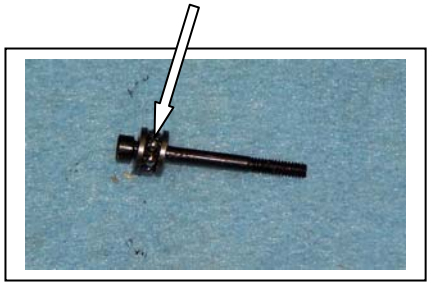


A7) Install the spring and T-nut into the male outdrive. Be certain the lugs on the T-nut engage properly in the slots of the outdrive. Set aside until A10.

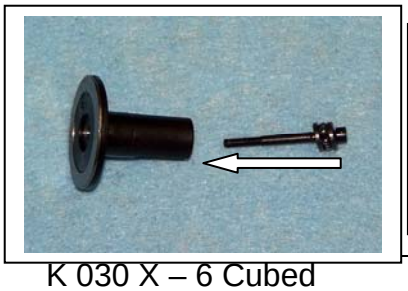


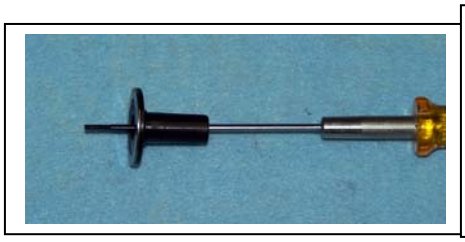
A8) Check the thrust washers for wear. They wear just as the diff rings do, and are also reversible. Stand the diff bolt up on end and install one washer on it with a new side up (left photo). Put some thrust grease all around the exposed surface of the washer and place the six thrust balls on the washer (center photo). We use a magnetized screw driver to pick up and place the balls. Then slide the other washer over the bolt, good side down (right photo). Don't use too much grease here – the assembly must be well lubricated BUT excess grease cannot escape and can cause the diff to malfunction! So after the inner washer is installed run your finger around the outside of the bearing assembly to remove any excess grease.

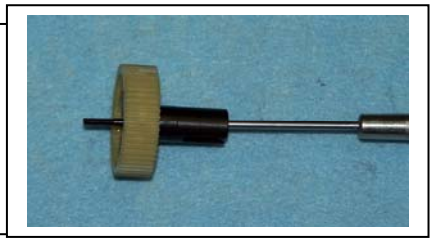




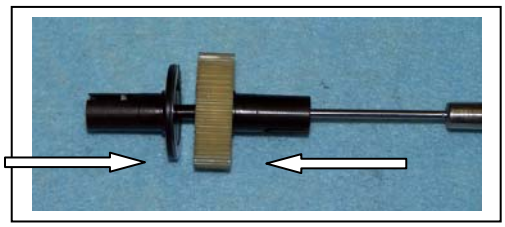
A9) Put the thrust bolt, with thrust bearing, on your Allen driver, and install the bolt into the female outdrive (center photo). Leave the driver engaged in the bolt through step A 10. Now put the diff gear, with balls and bearing, over the bolt so the diff balls contact the diff ring (right photo).



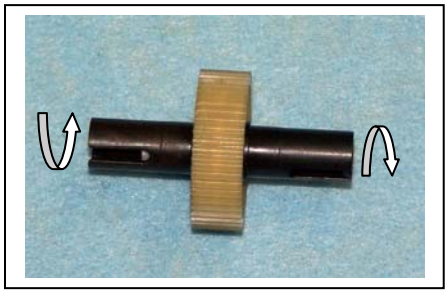


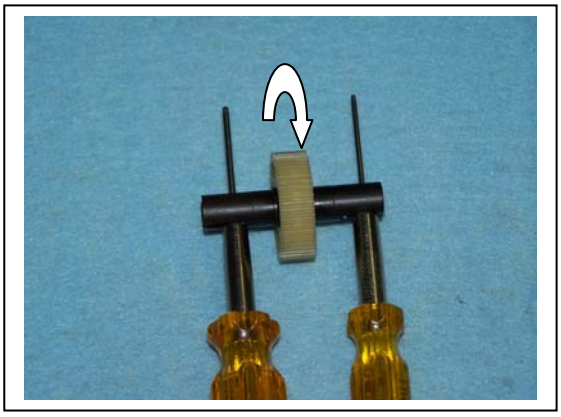


A10) Now slide the male outdrive from step A7 into the female outdrive assembly from step A9. Slide the diff bolt through the male outdrive and screw it into the T-nut. Do not tighten very much yet. See A11 below.

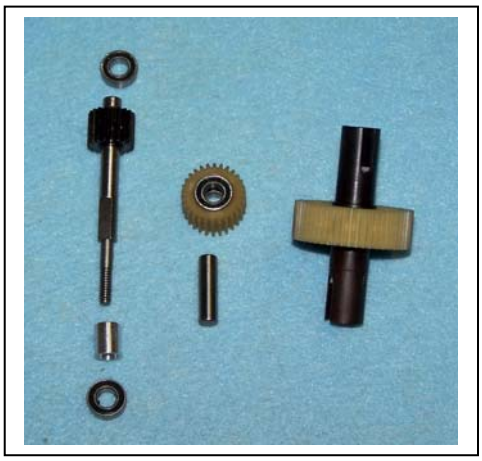


A11) As the bolt begins to tighten, stop every revolution or two, remove the wrench, and rotate the two outdrives at the same time in opposite directions while pushing them together (left photo). This helps seat the balls, rings, and thrust bearing while it distributes the grease. Keep tightening and rotating until there is a bit of tension on the bolt. Now put an Allen wrench through the slots of each outdrive, hold the wrenches still, and rotate the diff gear, Continue tightening the diff bolt, twisting the outdrives and checking with the wrenches, until the gear will no longer rotate at all between the outdrives. (right photo). As soon as the gear is driving the outdrives, stop right there. Be sure the outdrives will still rotate against each other. This will be a starting point for diff break-in and final adjustment.





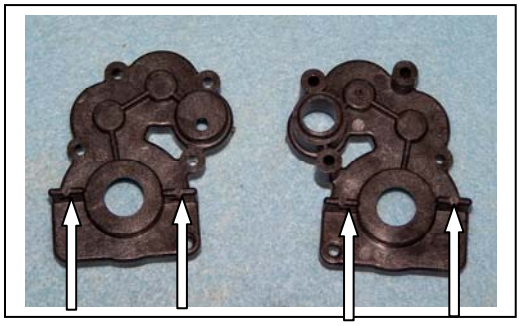
CLEAN & INSPECT



A12) We suggest you clean and inspect the rest of the B 4.2 transmission parts at this time. If you re-lube the bearings, make sure the outside is clean and dry so they do not attract dirt. You need the following items from your B 4.2: the assembled diff, the idler gear (AE9360) with its shaft (AE9361) & two 3/16" X 3/8" bearings (XF6202), and the top shaft (AE9601) with its spacer (AE9602) & two 3/16 X 3/8 bearings (XF6200). Replace worn parts as necessary.

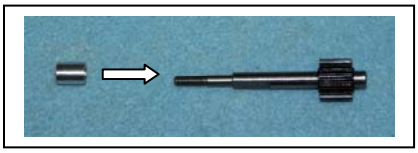
ASSEMBLE THE X – 6 Cubed TRANSMISSION

A13) Remove the transmission case (XF5001) from Bag A and separate the two halves. Note the small round ejector pin bosses on the mounting tabs. You may wish to file these flat for ease of installation in the truck.



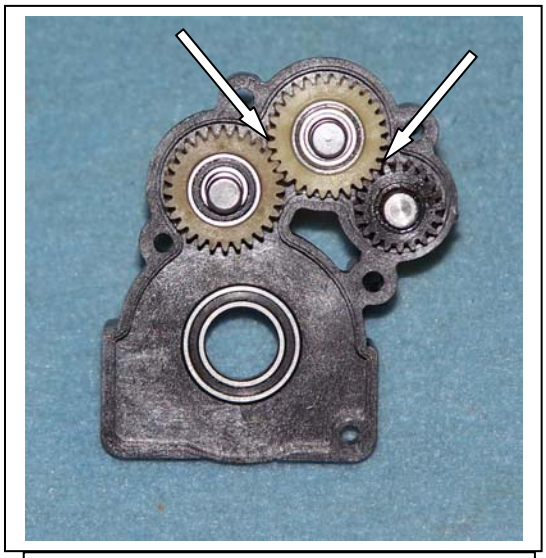
A14) Install a saved 3/16” X 3/8” rubber sealed bearing (XF6200) all the way into the top shaft boss in the left transmission case half (short arrow) and a 3/8” X 5/8” (XF6203) bearing from Bag A in the boss for the differential (long arrow). The Team pushes them in with the shank of an Allen driver or, better yet, with a socket. See Inst. A16.

A15) Make sure the spacer (AE9602) is on the top shaft (AE9601) and slide the shaft with spacer through the bearing in the transmission case. If your top shaft is worn, you will want to try our one-piece steel top shaft (XF5210) made for us by M.I.P. No more spacer to lose and longer wearing too!

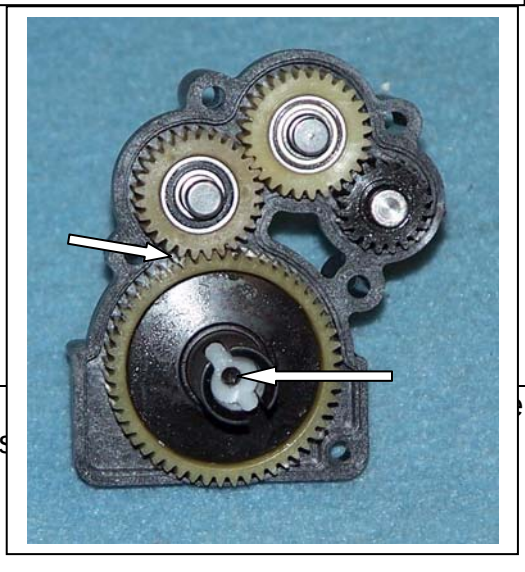


A16) Gather together the idler gear from the B 4.2 (AE9360) along with its 3/16” X 3/8” bearings (XF6202) and shaft (XF5201) along with the same parts from bag A so you have two gears, two shafts, and four bearings. Install a bearing into each side of both idler gears. Team drivers do it by pushing on the outer race with a socket.

A17) Slide an idler shaft through the bearings in each idler gear, then place the shafts in their bosses in the left transmission half. Be certain all gears mesh properly and the transmission turns smooth and free.

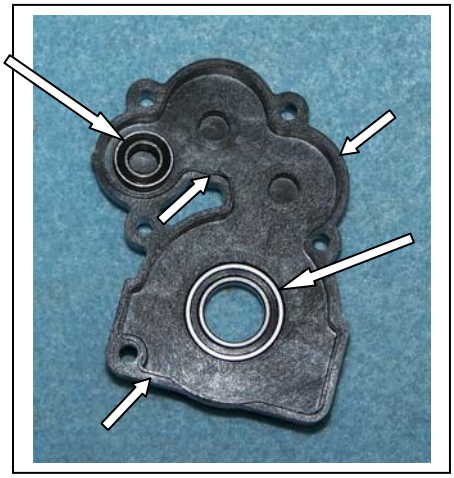


A18) Install the diff in the left transmission case bearing, ensuring it meshes properly with the idler gear. The head of the diff bolt should be up. Again, the

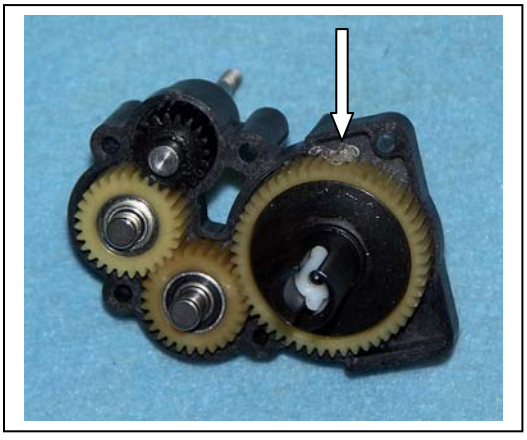


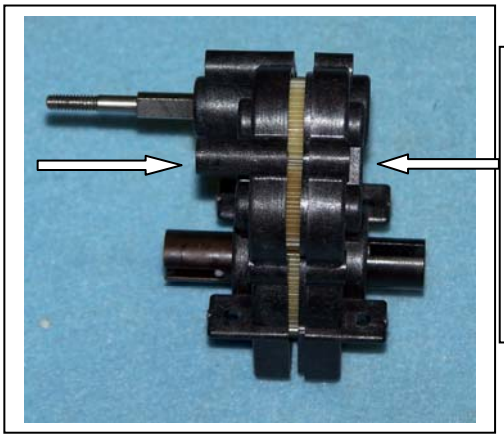
transmission should be free and smooth.

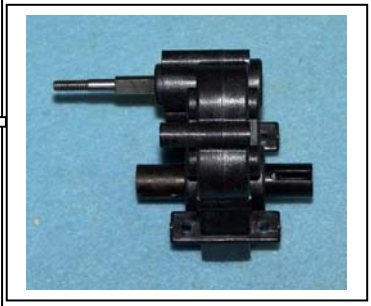
A19) Install the remaining 3/16” X 3/8” rubber seal bearing and 3/8” X 5/8” bearing into their bosses in the right transmission case half. (long arrows) There is a small hole in the case where the top shaft bearing goes so you can use a hex wrench to push out the bearing. Some drivers like to run a small bead of inexpensive grease around the mating surface of the right transmission case half. (short arrows) This grease is to seal out dirt, not to lubricate anything, so be thorough but don’t over-do it. Other Team drivers have discovered that the X Factory 4-Gear transmission case seals so tightly that they do not use the grease. It’s your choice.



A20) Some Team drivers put a *small* glob of grease on the diff gear to lubricate the transmission. That little glob will be spread throughout all the gears as the trans turns, so one little one is all that’s needed. Other Team drivers use no grease, saying the trans is freer that way. Pay your money and take your pick. Carefully put the two halves of the transmission together, sliding the outdrive through its bearing, the two idler shafts into their bosses, and the top shaft into its bearing. Make sure everything rotates very free and smooth. No hitches, no slow-downs. Now is the best time to fix any problem. Wipe any excess grease from the outside of the case.

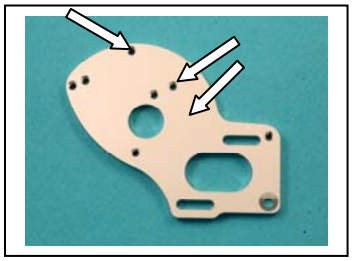


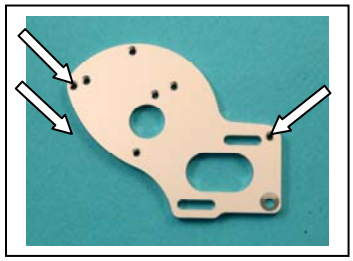


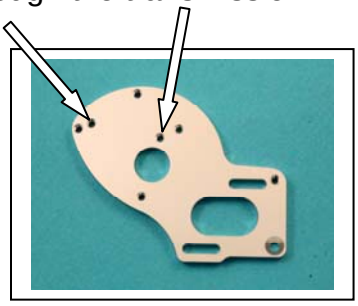


A21) Install the 4-40 X 3/8” cap head bolt (XF6001) in the lower corner of the trans case, just finger tight for now to hold things together.

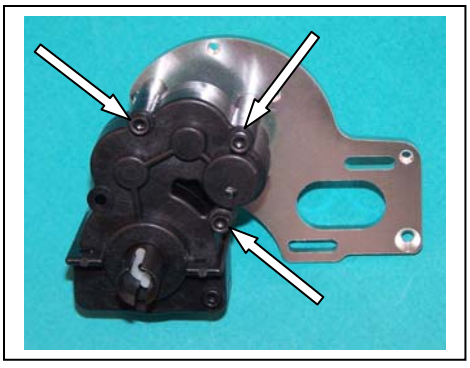
A22) The X Factory 4-Gear motor plate (XF1234) has four “extra” holes. Two of them (left photo, short arrows) are used to install the optional #5050 heatsink and fan. Two more may be used later *if* we make a gear cover (center photo, short arrows). Long arrows in the right photo point to the three holes that attach the motor plate to the transmission. Team drivers put a drop of threadlock now in these three holes. Don’t put the threadlock on the bolts as it will come off going through the transmission.

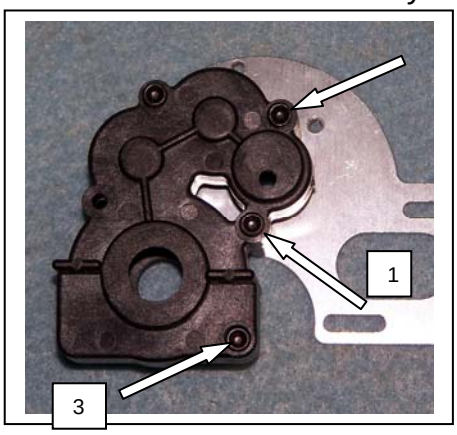






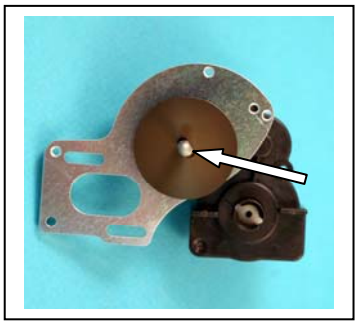
A23) Insert the three 4-40 X 1” screws from inst.16 through the three holes that go into the motor plate and attach the motor plate (left photo arrows). The center rear hole will not be used on the X – 6 Cubed due to a clearance issue. Use a crossing pattern to tighten all four trans bolts to equal tightness. Check one last time that the transmission rotates free and smooth. This is your last chance!



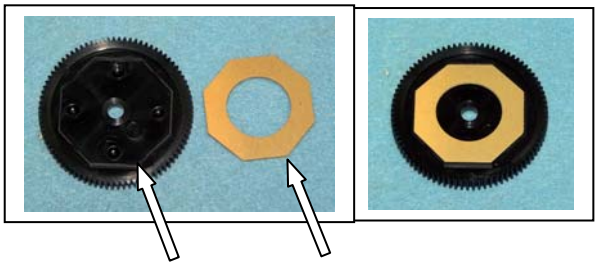


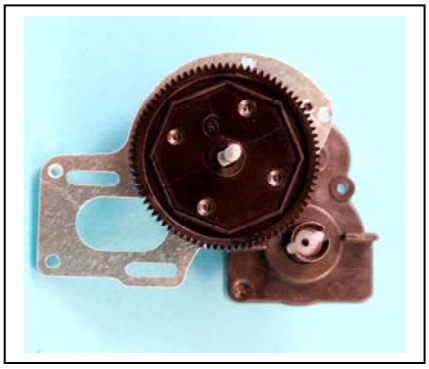
SLIPPER INSTALLATION

A24) Install a slipper plate (XF5530) onto the top shaft, flat side out. The flats inside the plate will key to the flats on the shaft.

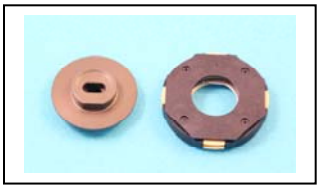


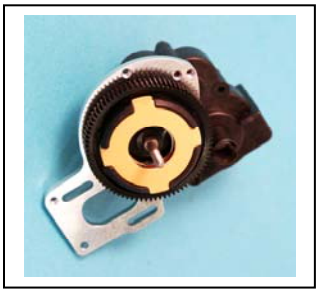
A25) Put the inner slipper pad (AE9603) on the spur gear (AE9651) (left & center photos). The hex of the pad fits into the molded hex in the gear. Now turn the transmission so the top shaft with slipper plate is facing down. Hold the plate on with your thumb and slide the spur gear, pad side up, onto the shaft so the pad & gear are tight against the plate. Keep pressure on the spur so the pad stays in its hex until step A27 below. This is so much easier to do now than when the transmission is in the car!

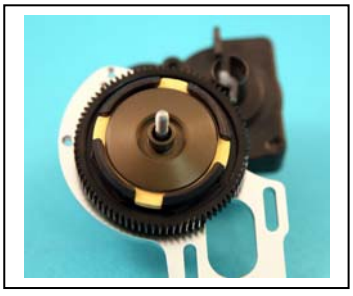




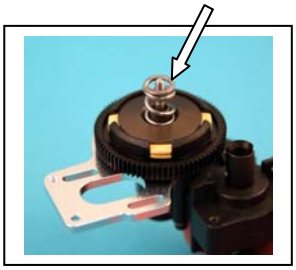
A26) Turn the transmission back over so the top shaft is pointing up, but be certain the slipper pad remains engaged in the spur and the spur is tight against the plate. Now place the slipper housing, with pads and center plate, onto the top shaft, followed by the outer slipper plate.

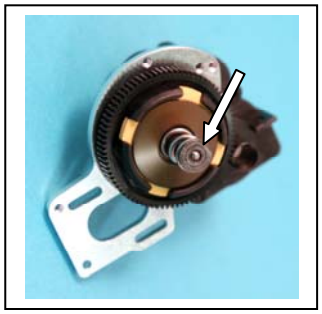


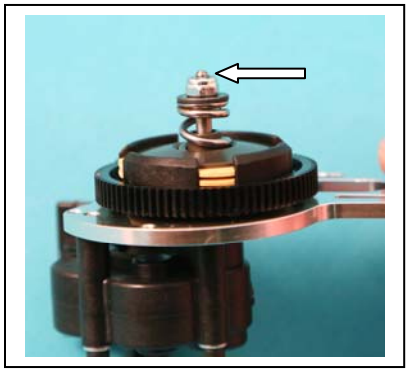




A27) Install the spring (AE9739) on the shaft so it fits into the slipper plate's hub, then place the black retainer (AE7486) over the spring, flat side up. Install the 5-40 nut (XF6074) to hold it all together, tightening until there is one thread of the shaft showing. Final adjustment later.







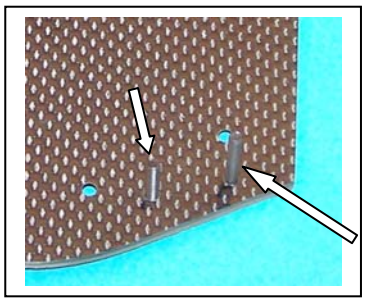
That's it for the hardest, longest bag. All downhill from here!

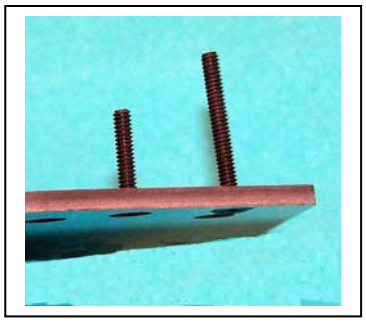
Set the trans aside and we'll do the front end.

BAG B

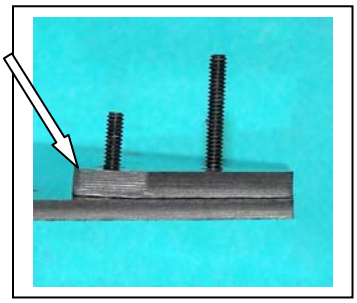
NOSE PIECE

B1) Place a 5/8” flat head screw (XF 6024) you saved from inst. # 12 up from the bottom of the chassis in the second hole from the front at the outside of right side of the chassis (short arrow). Place a 7/8” flat head screw (XF 6026) from Bag B up through the front outside hole (long arrow).

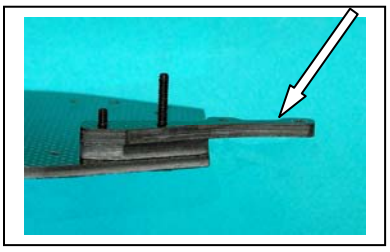




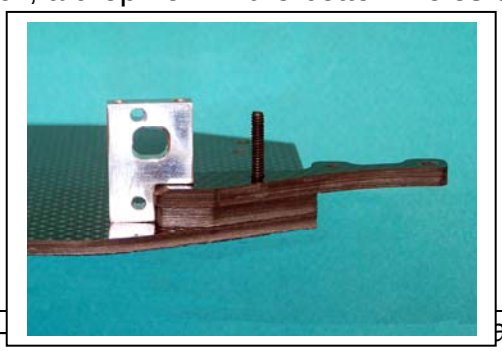
B2) Place a Nose Bridge Spacer (XF 1534) over the two bolts.

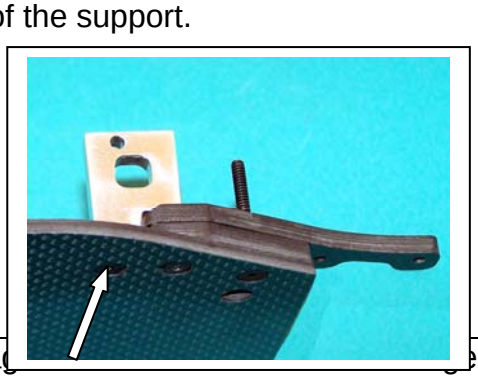


B3) Place a Nose Bridge (XF 1533) over the screws onto the spacer, curved side out.

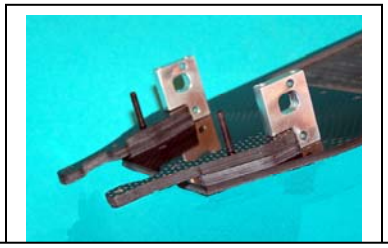


B4) Using a 3/8” Flat Head screw (XF 6022) from Bag B (arrow) and the 5/8” flat head, install a Top Deck Support (XF 1400). If you are using thread lock, a drop now in the bottom holes of the support.

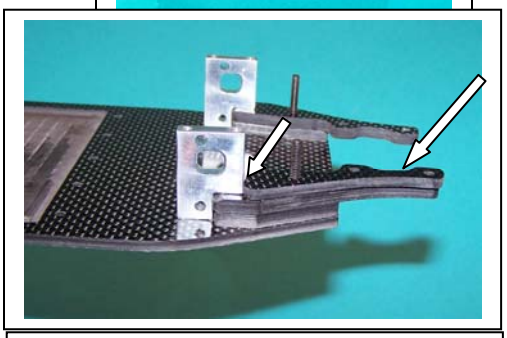




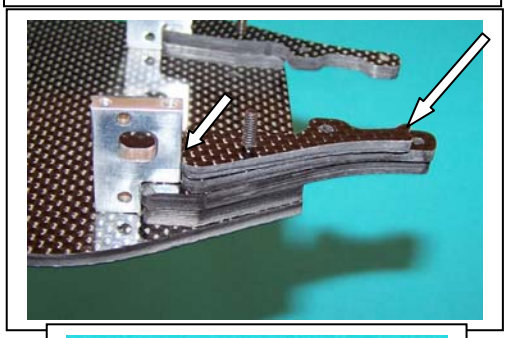
B5) Now repeat the first four steps for the left side.



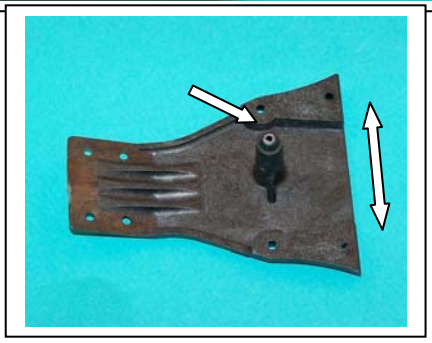
B6) Let's do both sides together now. Put the Lower Nose Bridge Stiffeners (XF 1535) over the 7/8" flat heads. They should fit snugly against the top deck support (short arrow).



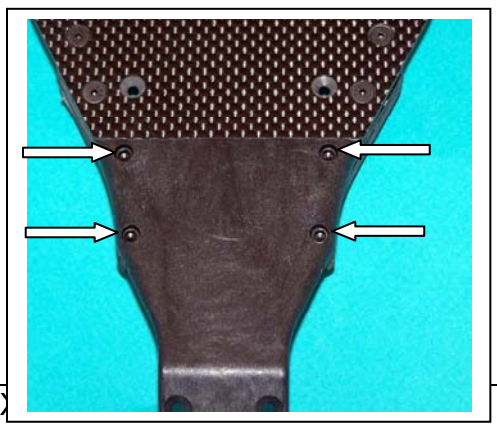
B7) Guess what? Now the Top Nose Bridge Stiffeners (XF 1536) Again, nice and snug against the top deck support (short arrow). Both sides, please, even though the photo only shows one.

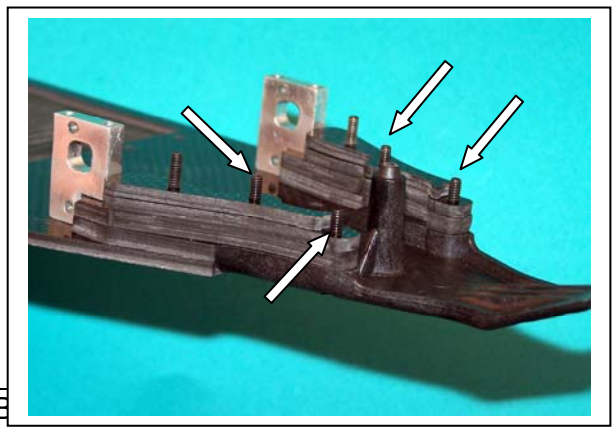


B8) Get the nose piece (XF 1002) from Bag B and touch it with a file if necessary to clean up any mold flashing. The back of it should be straight so there is no interference with the chassis (long arrow), and the post should be nice and round (short arrow) to fit well with the the AE top plate. Before installing the nose piece, check inst F14.

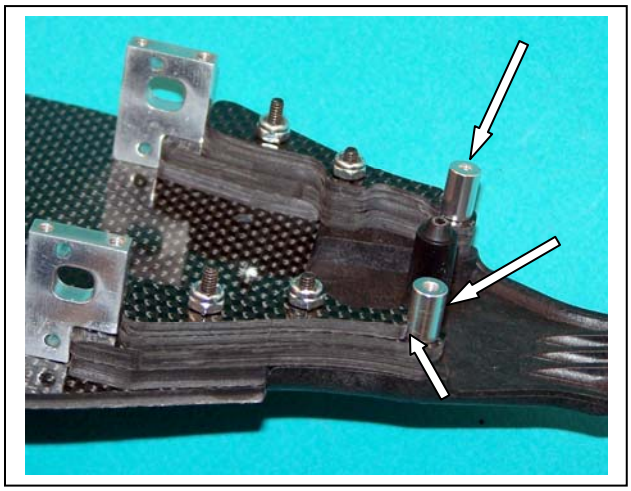


B9) Turn the chassis over and install the nose piece with the post to the top of the chassis. Use the four 5/8" Cap Head screws (XF 6003).

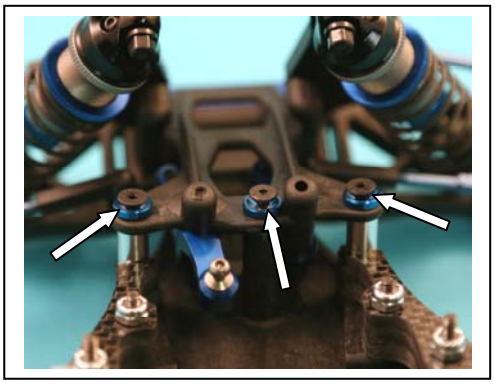




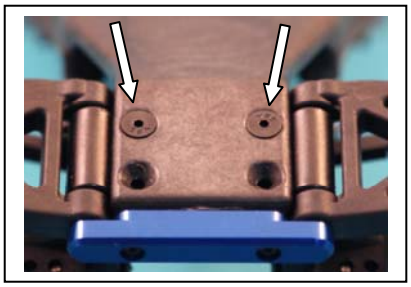
B10) Back to the top. Put the 13/32" Stand-Offs (XF 6803) on the two front screws (long arrows). They should snuggle up with the top stiffener (short arrow). If you are using thread lock, put a drop in the stand-off here. Hold them with a pliers and tighten from the bottom. Team drivers put a cloth between the stand-off and the pliers to keep the stand-off nice and shiny. Secure the other four screws with locking nuts (XF 6071).



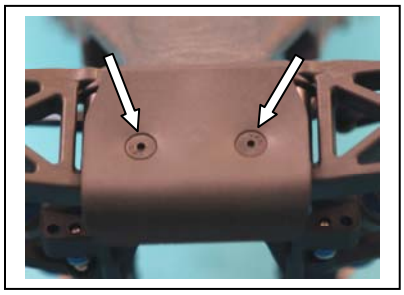
B11) Place the complete front suspension and steering on the X – 6 Cubed just as it was on the B 4.2. Secure the top plate (AE 9566) with the three screws and countersunk washers that were on the B 4.2. Drivers using thread lock should put a drop in the stand-offs. Finger tight for now. Make sure the top plate is snug with the nose piece.



B12) Turn the car over and use the flat head screws you saved to install the bulkhead to the nose piece. When everything is right, tighten the two bottom screws and the three on top from B11,



B13) Use the saved flat head screws to put the bumper on.



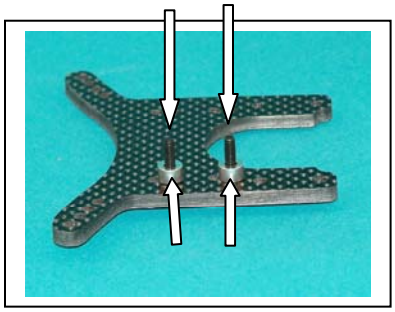
FRONT END'S DONE NOW, AND LOOKING GREAT!!!

BAG C

REAR SHOCK TOWER

C1) Install the wing mounts first. You will need the Rear Shock Tower (XF3315), Wing Mounts (XF 3500), and Wing Mount Spacers (XF 6806).

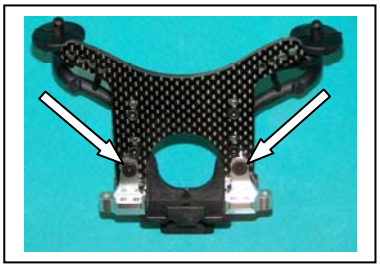
C2) Place two 4-40 X 5/8" cap head screws (long arrows) through the left wing mount holes. There are two sets of holes; here we are using the lower set. Consult the Set-Up Sheet and Tuning Section to determine which you want. Then put two Wing Mount Spacers over the bolts (short arrows).



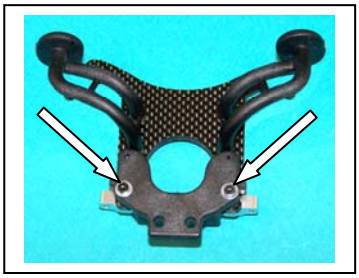
C3) Install the one wing mount, then the other.

C4) Place the Rear shock Tower (XF 3315) over the Rear Bulkhead (XF1313). Make sure the tower and bulkhead fit together properly (arrow) and the bolt holes line up.

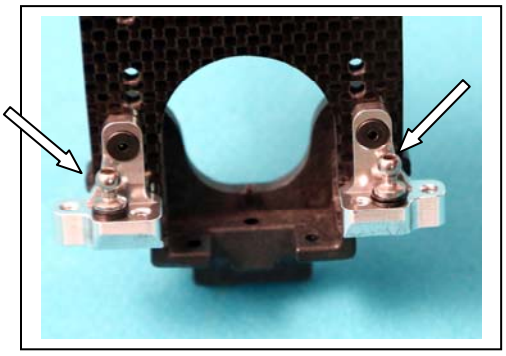
C5) Place the Ball Stud Lands (XF 3800) on the shock tower, then install finger tight with the 5/8” flat head screws (XF 6024) If you use thread lock, put a drop now in the lower tapped holes of the ball stud lands to prepare for inst. C6..



C6) Turn the bulkhead over and install the two 5/8” cap head screws (XF 6004) with flat washers (XF 6080). Now tighten the flat heads from C5.



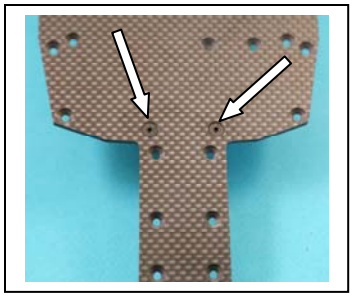
C7) Check the Set-Up Sheet and Tuning Section. Install the two ball studs you saved with any washers. We used the #2 hole with dialed Real Men Wear Black 0.030” steel shims.

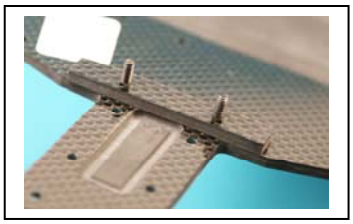


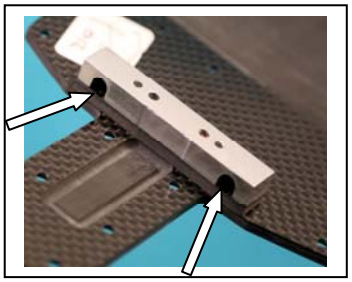
BAG D

TRANSMISSION INSTALLATION

D1) Place two 3/8” flat head screws (XF 6022) up from under the chassis, put the 2mm Hinge Pin Brace Spacer (XF 3262) over the screws, and install the Hinge Pin Brace (XF 3260) with the bushing holes (arrows) facing back.

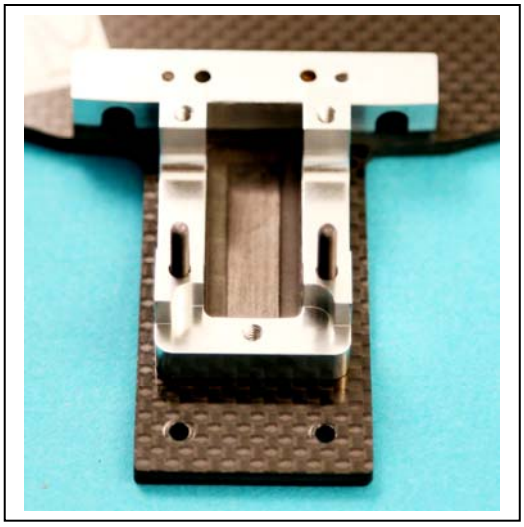




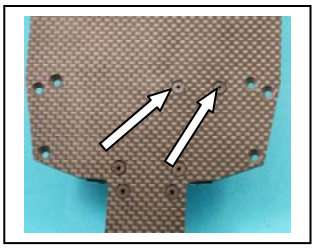
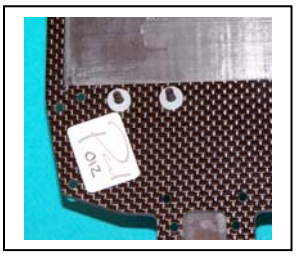
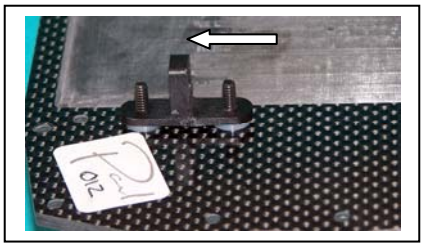


D2) Place two 3/8” flat head screws (short arrows) up from under the chassis for the front of the transmission cradle and two 1” flat head screws (XF 6027, long arrows) for the back of the cradle

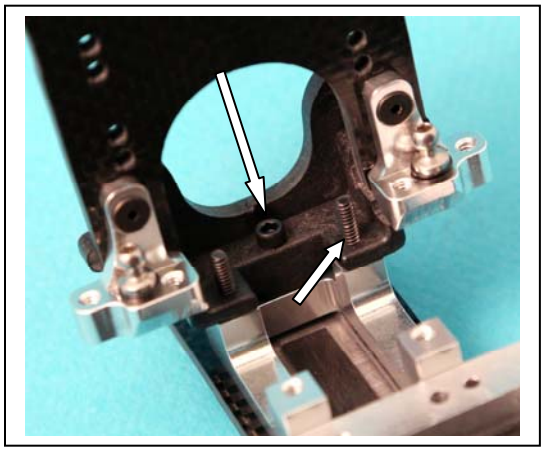
D3) Install the transmission cradle (XF5030). The front two 3/8 screws will thread in to the cradle and tighten down. If you use thread lock, a drop in each front hole now. The two 1” screws just go through the cradle, and you may have to hold them in until Inst. D5.



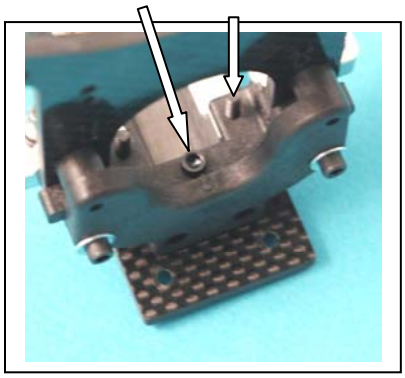
D4) Place two 3/8” flat head screws up from under the chassis for the Motor plate support bracket. Put one 0.030” spacer (XF 3250) on each screw, and install the motor plate support bracket (XF 1130). Leave these screws finger tight for now. Note that the bracket is off-set to the left.

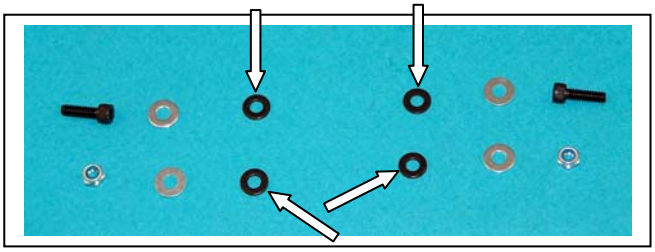
D5) Place the bulkhead and shock tower assembly into the rear of the transmission cradle and secure with the 1/2” cap head you saved from inst # 16 (long arrow). The bulkhead fits over the 1” flat head screws (short arrow).



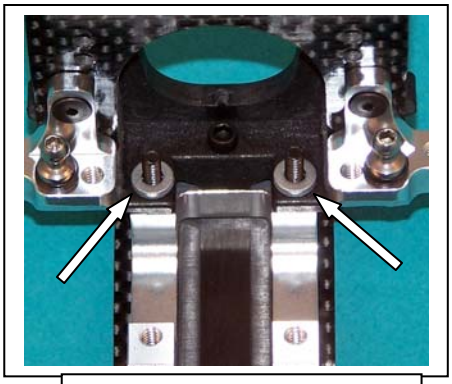
D6) Here is a photo from the rear:



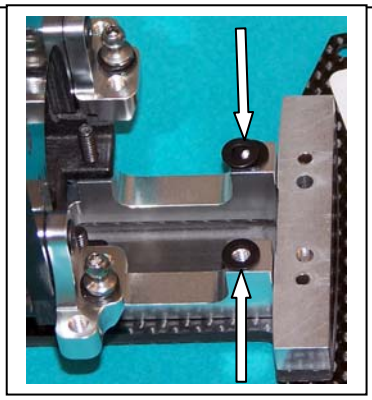
D7) Gather together the two 4-40 X 3/8” cap head screws saved from Inst. #14 and remove from Bag D two #4 mini nuts (XF 6073), and four #4 flat washers. Also, check the Set-Up Sheet and Tuning Section to determine which Transmission Shims (XF 5702) you will use, and remove those four shims from the little bag. Here we are using 0.030” (arrows).



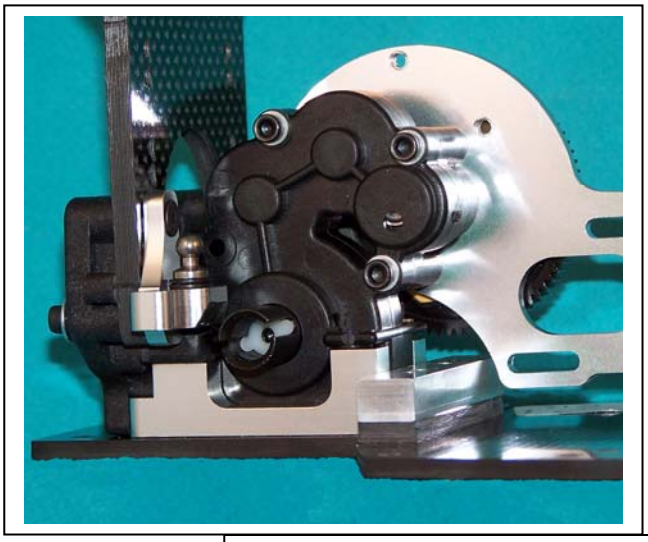
D8) Place a transmission shim over each of the 1” bolts that come up through the bulkhead. For this photo we have used 0.060” shims so they show well. This is strictly for purposes of clarity. It is important that all four shims be the same size on your X – 6 Cubed!



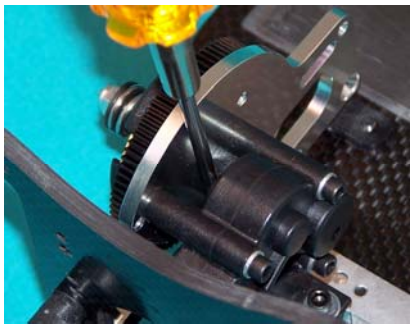
D9) Place the other two T\transmission shims over the front bosses of the transmission cradle. In this photo we have used the 0.030” shims for clarity. Again, make sure ALL SHIMS ARE THE SAME SIZE!

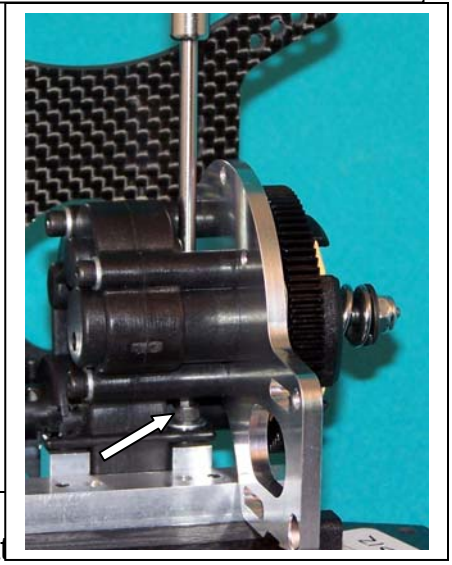


D10) Slide the transmission into its cradle over the shims. The back two shims will stay just fine, but the front two are another matter. Some drivers take the right front one out until after the left front bolt is installed, then slide the right front shim back in. Also quickly check that the motor plate mates properly with the support bracket. See the photo in D14.

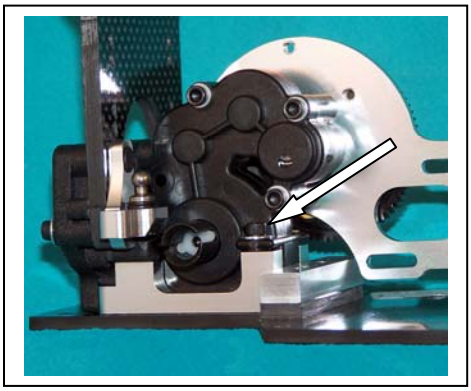


D11) Put a washer over a 4-40 X 38” bolt, and install the left front of the transmission. Finger tight for now.

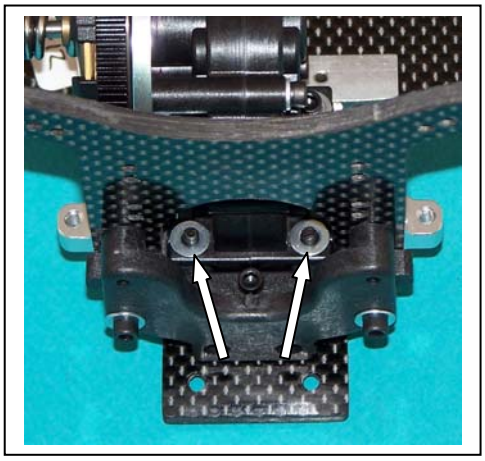


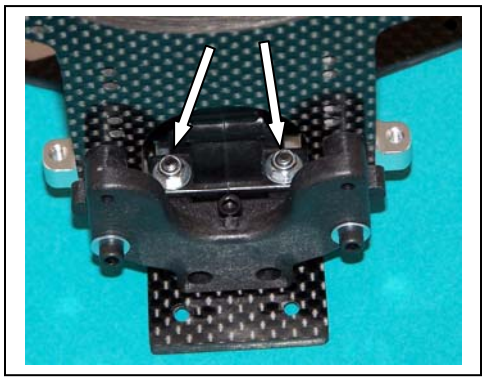


D12) Put a washer over the other 4-40 X 3/8" bolt and secure the right front of the transmission. Make sure the shim is still in there! Make this bolt finger tight for now.



D13) One last check now to be sure the correct shims stayed under the transmission at the rear, then put #4 flat washers over the 1" bolts (left photo) and secure with the #4 mini nuts (right photo). Once all four transmission fasteners are snug and the unit is comfortable in its cradle, put final torque on the two bolts and two mini nuts.





D14) Secure the motor plate to the support bracket with the 4-40 X 1/2" flat head screw, washer, and #4 lock nut, finger tight for now. If your transmission is higher than 0.030", add shims under the support bracket. Once it's all happy together, tighten the bracket bolts from under the chassis (D4) and the plate-to-bracket bolt (D14).

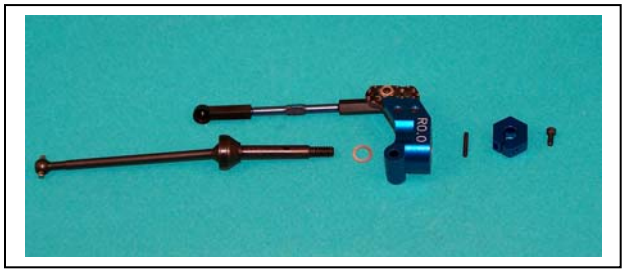
Many drivers think installing the transmission is the hardest single thing to do on an X Factory car, and it's done! Let's put the rear suspension on and finish.

BAG E

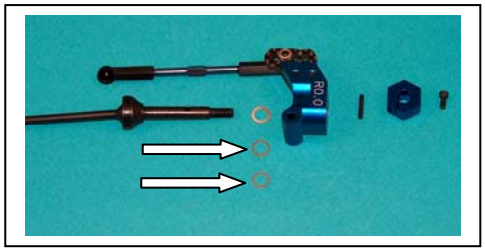
REAR SUSPENSION

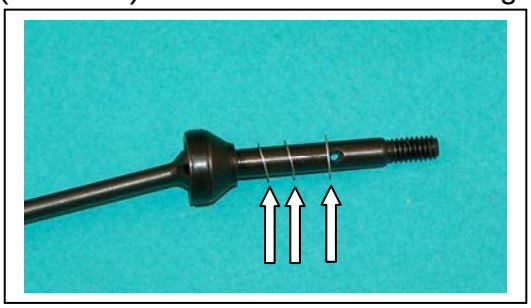
E1) Take the rear control arms (XF3012) from Bag E and remove the gurfelmurgles (arrows). Many drivers touch the arms with a file here.

E2) We'll do the right side first. Take the C.V.A. out of the hub. The bearings can stay in the hub, though we suggest you clean and inspect them now. Team drivers install the X Factory CF Hub Camber Plates (XF 9502) now. They use the lowered plates in many set-ups.

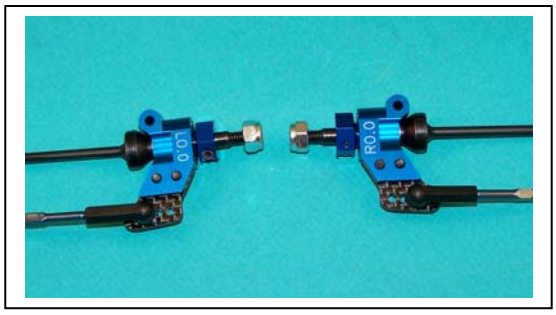


E3) We will add two 0.010" Axle Spacers (XF 6450) inside of the inner bearing in addition to the AE #7368 shim.

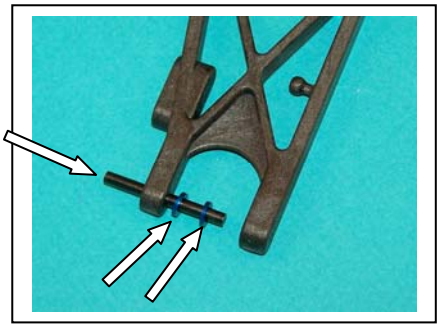




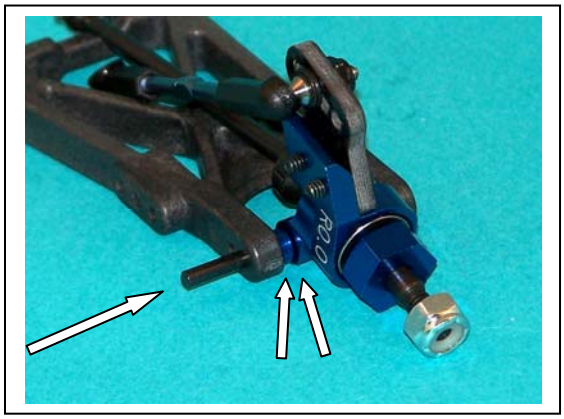
E4) Re-assemble the hub. The arrow shows the three shims. Repeat for the left side.



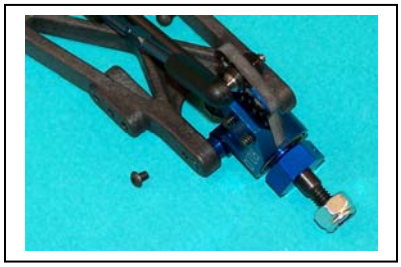
E5) Again, the right side first. Insert a hinge pin you saved into a control arm from the rear. Consult the Set-Up Sheet and Tuning section to determine your hub spacing. Here we have the two shims on the rear for hubs forward. The shock mounting holes are on the rear of the arm.

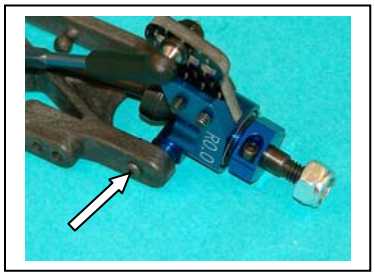


E6) Place the right hub (Marked R) on the hinge pin and continue sliding the pin forward. The two shims have remained behind the hub (arrows).

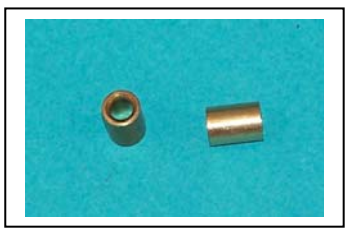


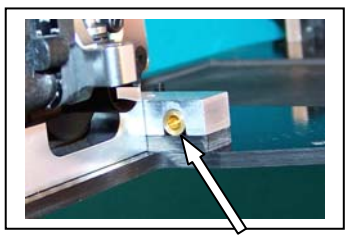
E7) Secure the hinge pin with the little 2-56 X 1/8" button head screw. Now where the heck *is* that little thing? If you lose one, they are XF 6053. Repeat for the left side.

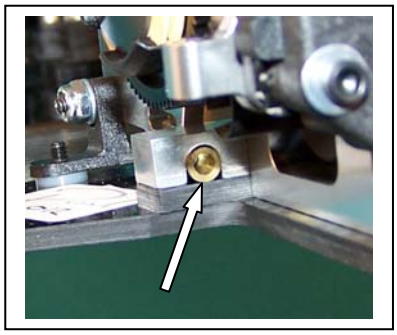




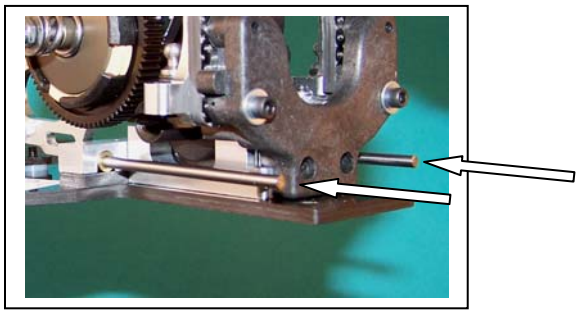
E8) Install a hinge pin bushing (XF 6142) in each side of the hinge pin brace.



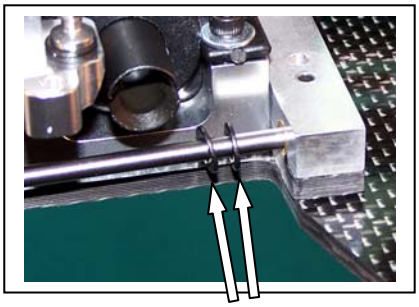




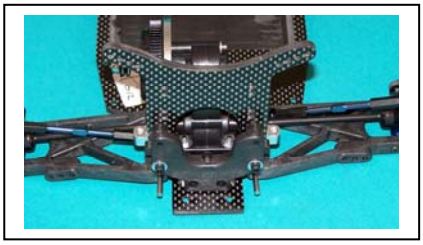
E9) Install the hinge pins (XF 6141) in the bushings.



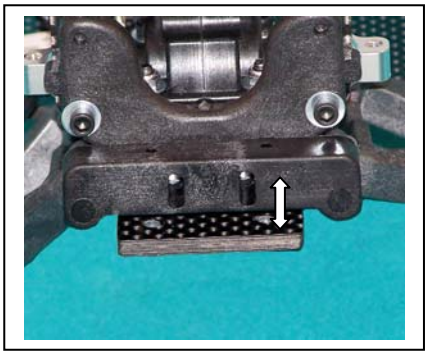
E10) Check the Set-Up Sheet and Tuning Section to determine how you will space your control arms on the hinge pin. Slide at least one thin shim over the hinge pin to prevent friction between the control arm and hinge pin brace. Here we have used two dialed Real Men Wear Black 0.030" shims.



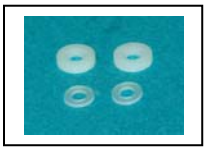
E11) Place the two control arms on the hinge pins. Shock holes to the rear!



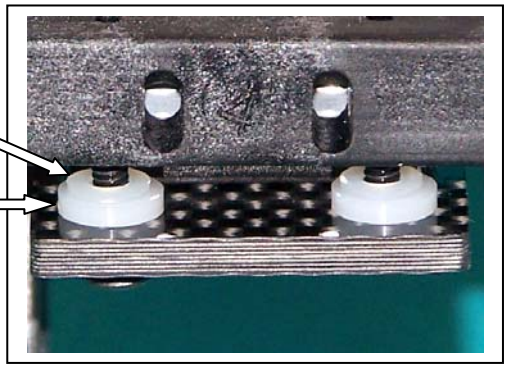
E12) Two Toe-In Bars (XF 3211) are in Bag E, marked 3 and 4. Check the Set-Up Sheet and Tuning Section to determine which bar you will use. Here we have used the 4^{o} bar. Slide the bar onto the hinge pins. Notice the bar will move up and down.

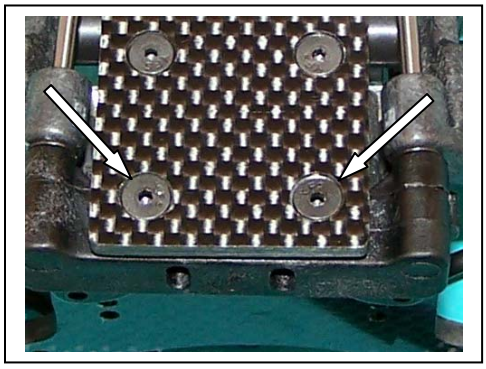


E13) Check the Set-Up Sheet and Tuning Section to determine how much anti-squat you will use, and select your Anti-Squat Shims (XF 3250) from the little bag. The two smaller shims are 0.030" thick, and four larger ones 0.060" thick, which allow you to make any combination from zero to 0.150". Each 0.030" = about 1 degree.

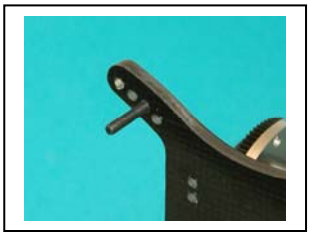


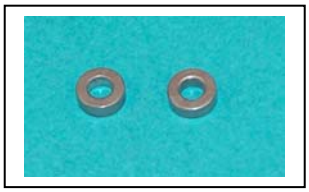
E14) Place the shims under the toe-in bar and secure with two 4-40 X 1/2" flat head screws saved from inst # 11. The photos show one of each shim, or 0.090".

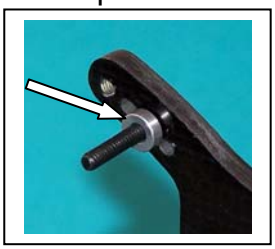




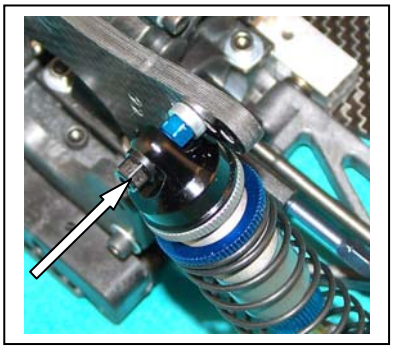
E15) Using the hardware you saved from the rear shocks, install the upper shock mounting bolt in the tower. Check the Set-Up Sheet and Tuning Section to determine how your shocks will be mounted. Here we are using the #2 hole. If you have Big Bore shocks, install a 0.060" spacer (XF 5702).



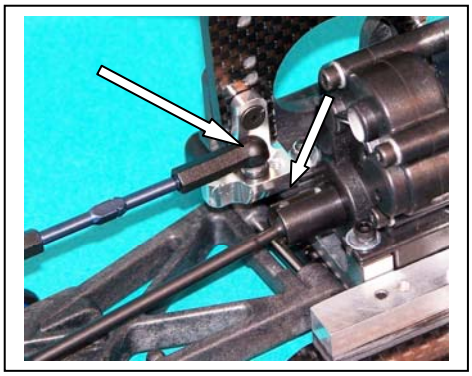


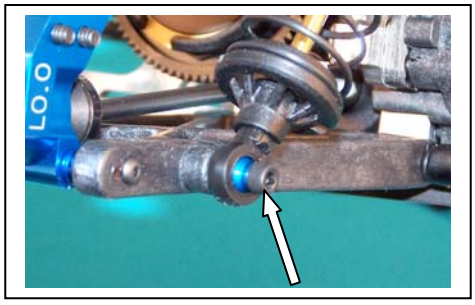


E16) Install the top of the shocks just as they were on the B 4.2.



E17) Put the dogbone in the outdrive (short arrow) and snap the ball cup over the ball stud (long arrow), then bolt on the bottom of the shock.

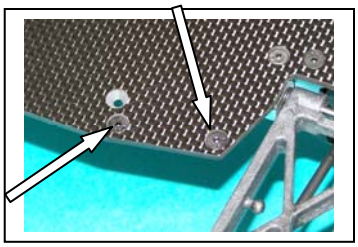




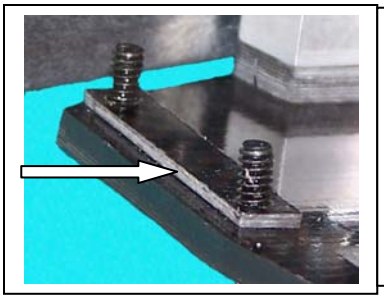
BAG F

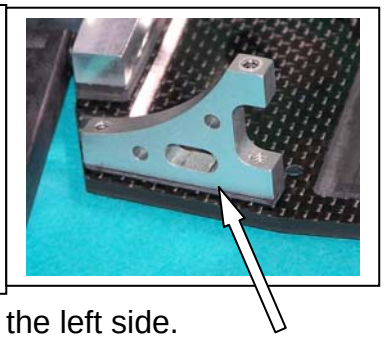
FINISH IT UP

F1) Place two 3/8” flat head screws up through the two holes at the right rear corner of the chassis.

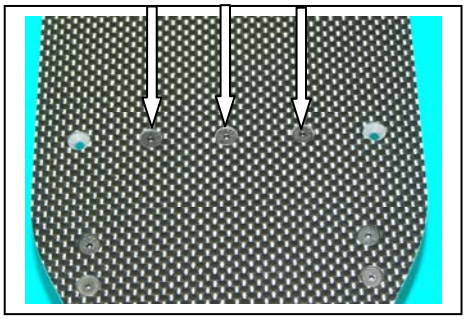


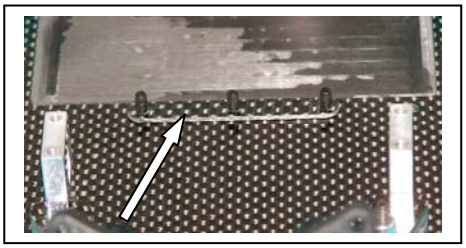
F2) Remove the bag of Chassis Shims (XF 1012) from Bag F and place one of the medium-size shims over the two bolts from F1 above. Then bolt on a Rear Top Deck Support (XF 1311). If you use thread lock, a drop in each hole of the top deck support. Repeat for the left side.



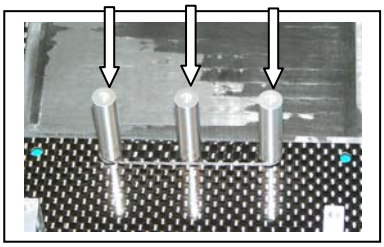


F3) Place three 4-40 X 3/8” flat heads up from under the chassis in the center just ahead of the battery compartment and put the long chassis shim over them.

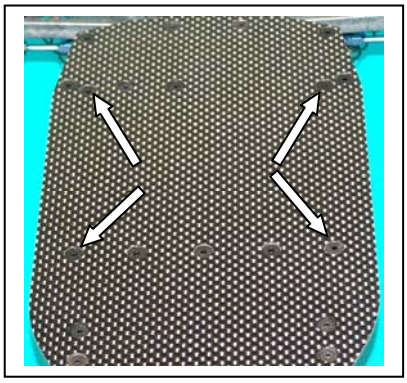


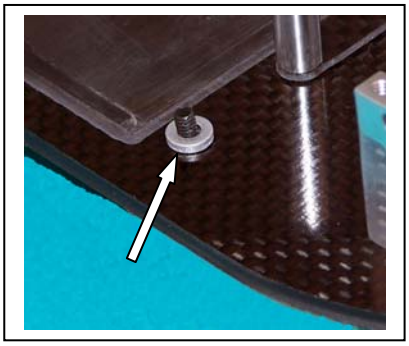


F4) Install the three long 1” Stand-Offs (XF 6801). A drop of thread lock on the stand-offs if you use it. Again, a cloth and some pliers will help.

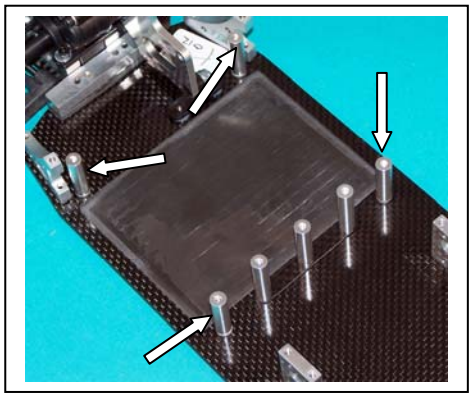


F5) Place four 4-40 X 3/8" flat head screws up through the chassis, one at each corner of the battery compartment, and put a 0.060" shim on each bolt.

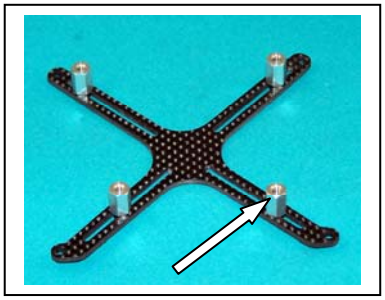


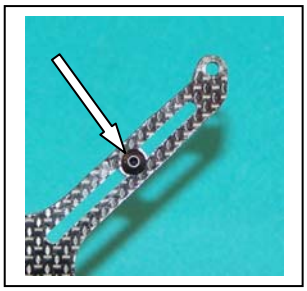


F6) Install the four 7/8" Stand-Offs (XF 6802). If you are into thread lock, a drop in each one.

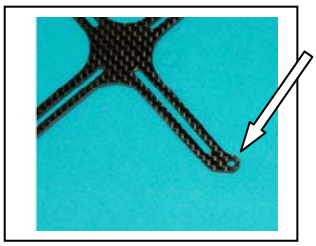


F7) Find the two button head screws you saved from inst. 11 and the two 4-40 X 1/4 button head screws (XF 6041) from Bag F. Install the four 0.156" Hex Stand-Offs (XF 6805) in the slots of the battery strap (XF 1229). Finger tight for now. The stand-offs will hang down to locate the battery.





F8) Check the Set-Up Sheet and Tuning Section, then put the battery in the car where you want it. Now put the battery strap in position, hold the strap in with four 4-40 X 3/8" button head screws (XF 6042) finger tight, and adjust the stand-offs to keep the battery in the desired position. Now tighten the stand-offs. You can leave the battery in for now or remove it, then tighten the battery strap to the 7/8" stand-offs. The side of the battery strap with the dog leg is the front.

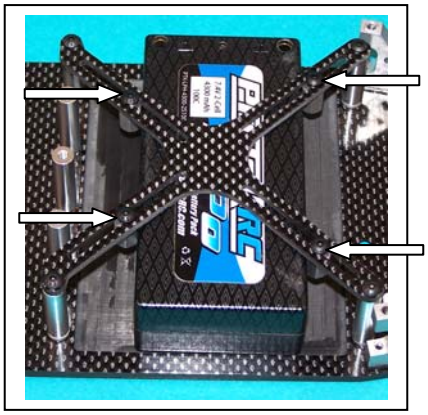


F9) SADDLE PACK Use the battery spacer foam (AE 9238) from your B 4.2 between the two saddle batteries to space them out to the edge of the battery compartment. For pack forward (left photo) use only the rear two hex stand-offs, adjusting them to hold the battery tight against the front of the battery compartment. For pack back (right photo), use the front two hexes.

SHORTY PACK Here you have more choice of placement. The pack can go anywhere in the battery compartment.

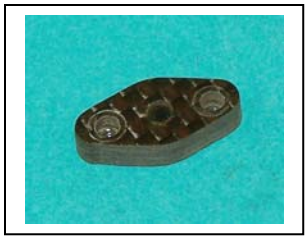
<u>Pack Forward</u>
Only 2 rear hexes

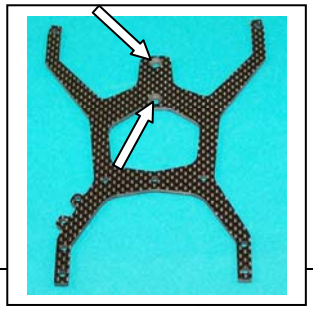
<u>Pack Center</u>
All four hexes

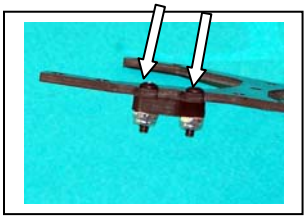


<u>Pack Back</u>
Only 2 front hexes

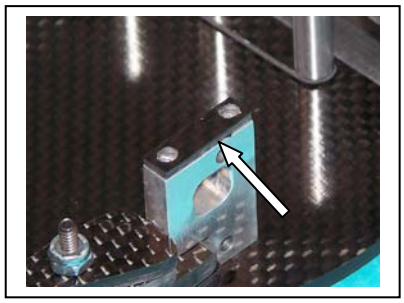
F10) Put the Antenna Mount (left photo, XF 9001) on the bottom of the Top Deck (XF 1503). The bottom of the top deck is the side with the two countersunk holes (center photo) which accept the bracket of the optional Transmission Brace (not included). Use the two 4-40 X 1/2" button head screws and locking nuts. Mount and nuts on the bottom to clear the body.

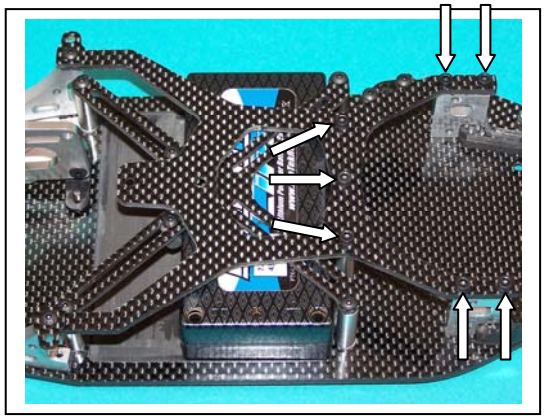




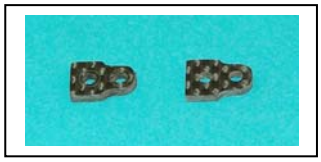


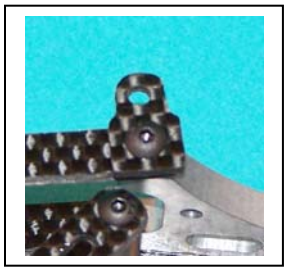
F11) We are showing you the top deck here because it makes sense to us this way, but you may want to install the electronics before the top deck. Place the smallest two chassis shims on the front top deck supports (left photo) and place the top deck over its supports. Use seven 4-40 X 3/8" cap head screws for the front deck supports and center posts.





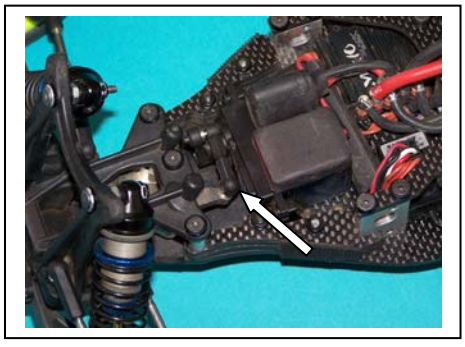
F12 Place a 4-40 X 3/8" Button Head screw through each dialed carbon fiber (!) Body Mount (XF 6321), then attach the rear of the top deck. The body mounts should be at 90^{o} to the top deck, not the top deck support. Team drivers often put a small bevel around the top and bottom of the rounded portion of these body mounts so the body clips slide on and off easier.



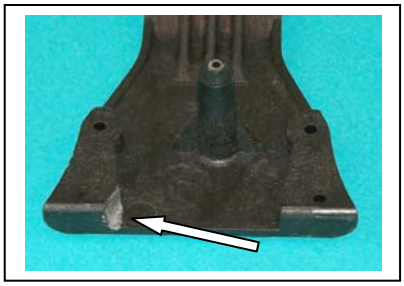


ELECTRONICS

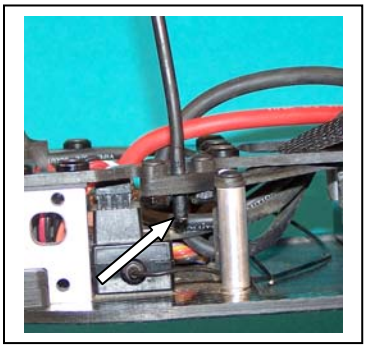
F13) Mount the servo in the Cubed just as it was in the B4.2. Attach the servo link. If you have not removed the servo horn, if should be set perfectly. Don't be confused. This is a photo of Paul's car and he mounts his transponder and E.S.C. capacitor on top of the servo



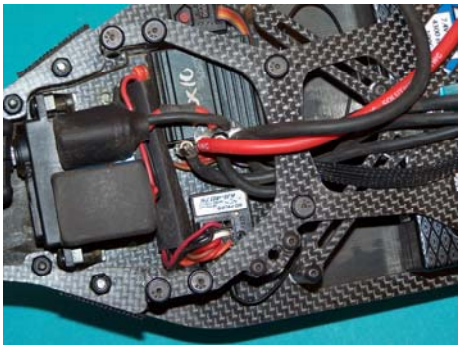
F14) If your servo is wide, it may foul the corners of the nose piece. Not to worry, just use a file or a rotary tool to remove about 1/8" of material from raised corner of the nose piece where indicated. We have been doing this for several years and there is lots of material here, so you won't weaken it. Only the left side has been done in this photo so you can see the difference.

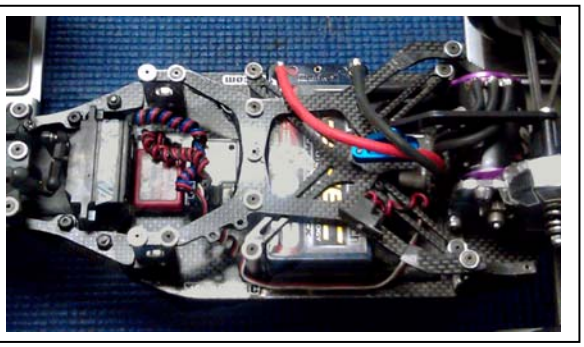


F15) Install the antenna tube into its mount by pushing it through from the top. Extend a part of the tube down below the mount so the wire does not touch the CF. This helps keep the glitch demon in his cage.

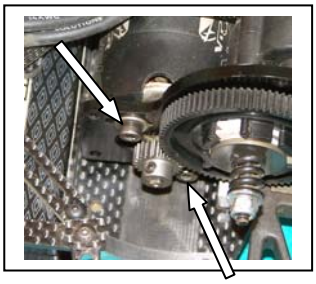


F16) The photo on the left is Paul's car with E.S.C. and receiver installed. The right photo is Team driver Dan Reino's car with the shorty pack forward and the E.S.C. between the battery and motor. Dan's way is not legal for R.O.A.R. but it works well at Thunder R/C, Dan's home track. Of course, you can do this any way you want!





F17) Install the motor, using the saved screws.



PARTS LIST

PART #	DESCRIPTION
1002	Nose Piece
1012	Chassis Spacers, CF
1013	Chassis, CF, X – 6 Cubed
1130	Motor Plate Support Bracket
1229	Battery Strap, CF, X – 6 Cubed
1234	Motor Plate, Lowered
1311	Top Deck Support, Rear
1313	Bulkhead, Rear, Tower Forward
1400	Top Deck Support, Front
1503	Top Deck, X – 6 Cubed
1533	Nose Bridge, CF
1534	Nose Bridge Spacer, CF
1535	Nose Bridge Stiffener, Lower, CF
1536	Nose Bridge Stiffener, Top, CF
3012	Control Arms, Rear, All X – 6
3211	Toe-In Bars
3250	Plastic Shims
3260	Hinge Pin Brace, Rear
3262	Hinge Pin Brace Spacers, CF
3315	Shock Tower, Rear, CF, X – 6 Cubed
3500	Wing Mounts
3800	Ball Stud Lands
5001	Transmission Case
5030	Transmission Cradle
5201	Idler Shaft
5702	Transmission Shims
6001	4-40 X 3/8” Cap Head
6003	4-40 X 1/2” Cap Head
6004	4-40 X 3/4” Cap Head
6022	4-40 X 3/8” Flat Head
6023	4-40 X 1/2” Flat Head
6024	4-40 X 5/8” Flat Head
6026	4-40 X 7/8” Flat Head
6027	4-40 X 1” Flat Head
6041	4-40 X 1/4” Button Head
6042	4-40 X 3/8” Button Head
6043	4-40 X 1/2” Button Head
6071	#4 Nylock Nut
6073	#4 Mini Lock Nut
6080	#4 Flat Washer
6141	Hinge Pin, Ti, 2.350”
6142	Hinge Pin Bushings
6202	3/16” X 3/8” Bearing, Metal Shield
6203	3/8” X 5/8” Bearing, Rubber Shield
6321	Body Mounts, CF
6450	Axle Shims, 3/16” X 1/4” X 0.010”
6801	Stand-Off, 4-40 X 1”, Round, female/female
6802	Stand-Off, 4-40 X 7/8”, Round, female/female
6803	Stand-Off, 4-40 X 13/32”. Round, female/female
6805	Stand-Off, 4-40 X 1/4” X 3/8”, Hex, female/female
6806	Spacer, 1/8” X 1/4” X 0.156”
8024	Body & Wing
8243	Decals, X – 6 Cubed
9001	Antenna Mount

FINAL SET-UP AND PREP

ELECTRONICS

Now that the car is built and electronics installed, it's time to make certain it 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 is from your T 4.2, a re-do never hurts. Once the radio and receiver are having fun 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 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 right 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 until there's a gap. 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 car's performance and diff life. With the car all prepped as above, install a charged battery and put 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, with no throttle input, 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 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 use 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 a slipping diff. 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 want, 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 Cubed. 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 transmitter and car 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 Cubed as you do this. The higher off the table your front tires get the tighter your slipper is set.

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 Cubed is more adjustable than most R/C cars, adding options like the transmission height and super-easy anti-squat adjustment plus the ability to change rear pivot height..

It's easy to get lost though, and over the years we've learned that at any given track, only a few adjustments will help the car get around the track faster. 90% of set-up changes only change the way the car feels to you. The trick is to find those few changes that really make a difference in lap times, and use the other changes to make the car suit your driving style. If you ever feel lost -- 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* your 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 – your third- and fourth-fastest laps will be quicker. If the whole run is within two or three tenths of the fastest lap, 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 seems to have little effect, or even makes things worse. Some adjustments are subtle, and different driving styles are sensitive to various adjustments. Learning that an adjustment didn't work as expected 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 Cubed

The mid-motor slim-line X – 6 Cubed is obviously a lot different than a wide rear-motor car, and it can take a bit of practice to get used to the new characteristics. With its weight more central the X – 6 Cubed naturally caries more corner speed. With no "pendulum effect" from the motor hanging off the rear, 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 cars 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 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-up in this manual has several features that add rear traction; these help ease the transition to driving a mid-motor car. As part of this the U.S. starting set-up runs the rear arms and hubs all the way forward. You can also try the 4^{o} toe-in bar for additional forward bite. 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 set-ups posted by Team drivers and other Family members on our website, and feel free to post questions about your car on X Factory's FB page. 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 the Race Prep section 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 – similar to 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

The X – 6 Cubed Set-Up sheet calls for 30^{o} caster blocks in U.K., 25^{o}.on dirt. These make a difference in steering on corner entry, exit, and through the corner. 20^{o} blocks available (ASC #9592); compared to the 30^{o}, 25^{o} takes away from turn in while adding exit steering and 20^{o}.goes even further. Once you settle on the blocks the suit your driving style, there are other 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 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. There are so many ways to skin this cat!

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 the 2mm shim under the hinge pin brace and no rear spacers, the car has 4^{o} of

anti-squat; with approximately 0.120” (3 mm) of rear spacing the car has 0^{o}, 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 (rear of pins down) 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 (pins closer to level) 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. On the X – 6 Cubed it’s quick and easy to change, so have a play with it and see what you like best.

Your X – 6 Cubed also has a 2mm spacer under the hinge pin brace, which sets the height of the rear pivot. Another way to say this is to call it the distance between the outdrives and hinge pins. This distance affects a number of things, including the mix of forward bite and side bite. Adjusting the hinge pin brace shim will affect anti-squat, and your rear spacers should be adjusted accordingly. XF part # 3262 is a set of three CF hinge pin brace shims, 1mm, 2mm, and 3mm. The 2mm shim is standard in your Kit.

REAR WHEELBASE

The wheelbase of your X – 6 Cubed 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 CVA 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 Cubed. It’s one of the most commonly used adjustments for Team drivers. 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 Cubed 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 D (step D7) are several sets of transmission shims, four each of .030", .060", and .090". Counting zero, that's four 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 the .060" and .090" setting, you'll want to add more shims to the motor plate support bracket. 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 between the wheel washer and outer wheel bearing 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 the distance between the inner hinge pins and outdrives which changes several things at once; a greater distance (higher trans) allows the CVD to exert greater force on the suspension. It also changes the car's center of gravity slightly because 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 through rough sections.

FRONT AND REAR TOE ADJUSTMENTS

Toe-in (or out) is the angle of the tires to parallel when viewed from above. At zero degrees of toe 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. Front wheel toe is easily adjusted by turning the steering tie-rods between the steering rack and the steering blocks. Front tires are generally run with zero degrees of toe. Adding some toe-out will increase initial steering, 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 tor-in block (installed in step E12). 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. A drag car would use lots of rear toe-in.

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 usually 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 to watch 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 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." "Above level is when the seams are angled down at the outside. 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 toe-in block through the chassis life, so measuring under the transmission will be more consistent.)

The standard ride height is with the front arms level, or about 30 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 29 mm 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; the car will feel more direct, with faster reactions, and it 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 it more difficult to control on the track.

CAMBER LINKS

Camber links are a complicated but effective adjustment on any R/C Car, and your X – 6 Cubed 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 lean or 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. Secondly, look at 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 Cubed offer much 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. AE makes standard shocks, the V2 shocks, and big bores with lots of different springs, 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 big bore shocks & springs generally give a more "plush" feel, especially on rough tracks or those with large jumps. By using spring retainers from other manufacturers, big bore springs can be put on standard shocks; this often works very well on smoother indoor tracks with smaller jumps.

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 as the piston moves faster. The faster the piston moves, the more it "packs up," and it does this on any stroke, even if there is only one. The smaller the shock piston holes, the more quickly the shock will pack and the greater the force will be. Larger piston holes are the opposite. By adjusting the shock pistons and oil together, you can tune both the static damping and pack separately. 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 CVAs cannot pop out of the outdrives; especially when using the inside shock hole on the rear arm the X – 6 Cubed 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 CVA 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 Cubed is different than most other “cab-forward bodies in several respects; it was designed primarily to create traction but still looks great!ll: The rear is upswept like all X Factory bodies to generate rear traction. In the front, the X – 6 Cubed’s windshield is a bit further forward than most and has a steeper angle to create bite on the front wheels at the end of the straight and help keep the nose down in jumping. Take the body off for practice once – we’re pretty sure you’ll want it back on before completing the first lap.

X Factory’s huge #8101 high downforce wing, standard on the X – 6 for years, is a big reason: our cars develop the most rear traction of any car out there. It’s good at its job. Air comes off the body and hits that scoop behind the shocktower, the #8101 wing is as wide as legally allowed, and the rake on the back is quite noticeable.

Your Cubed is equipped with our new #8103 medium downforce wing. It is 1/2” narrower than the #8101, and the rear kick-up is 5^{o} less, so it generates less downforce. Both wings fit your Cubed, so if you want more rear traction at the end of the straight, try the #8101 wing.

The key our wing is that it’s adjustable: you can always trim it down. Kind of hard to add lexan to a smaller one though...Also, on both wings the side dams are as large as the rules allow; they can be trimmed too.

Most Team drivers have several of both wings with them, each with a different Gurney height (the vertical piece at the back, named after Dan Gurney, American F1 driver and team owner). Obviously, higher Gurney = more force. 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.