



Congratulations on your purchase of a Speed Merchant SpeedSpec 2 competition chassis.

This instruction manual will detail the specific steps involved to build your new car. Make sure to take your time when building, since even though there are very few parts in this kit, it is important to make sure that everything is smooth (metal parts such as kingpins, pivot balls, etc are polished, and that nothing binds) and working the way they should. This will make noticeable difference in the handling of the car out on the track.

#### Required tools and supplies:

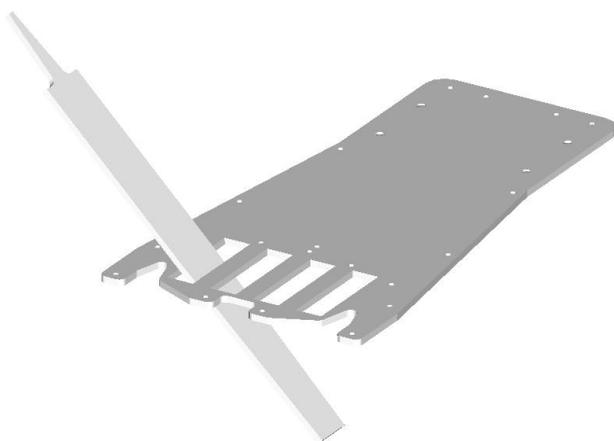
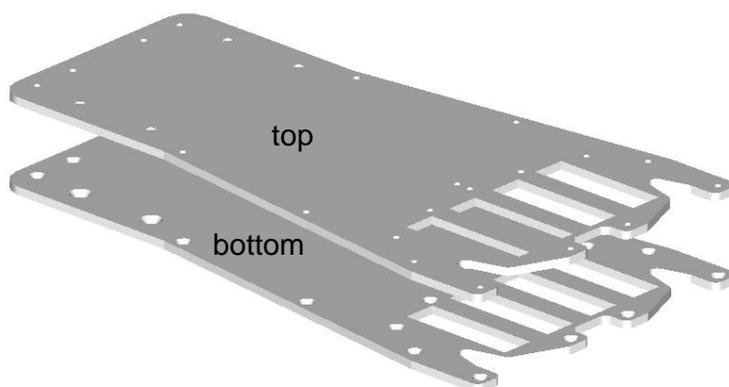
- .050" Hex driver
- 1/16" Hex driver
- 3/32" Hex driver
- 5/64" Hex driver
- 3/16" Nut driver
- 1/4" Nut driver
- 3/32" Nut driver
- File
- Cyanoacrylate Glue  
(CA or super glue)
- 35 Wt. Shock Oil (recommended)
- Tube Spooge (damper tube lube)
- 1/8" and 3/32" Drill bits
- 82° countersink
- Metal polish
- Double sided tape (servo tape)
- Ruler
- Pen or pencil

#### Additional required parts:

- 540 sized electric motor
- Electronic Speed Controller
- Radio Transmitter
- Radio Receiver
- Servo (standard sized)
- Servo saver  
(to match servo brand)
- 4 Cell Sub-C size  
NiMh or Ni Cad Battery
- Tires and Wheels
- Body shell
- Paint for body shell

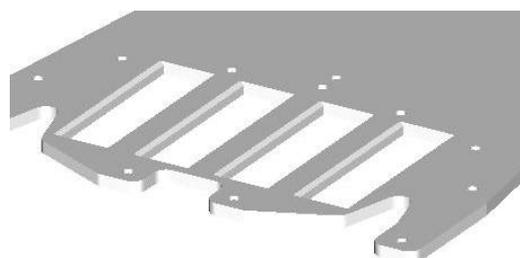
## Chassis prep:

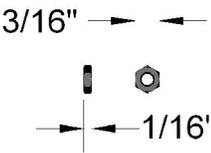
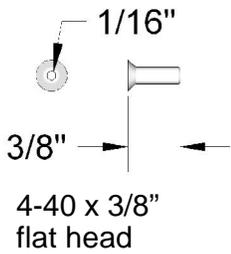
Shown here is the chassis top and chassis bottom. Note that the chassis bottom has countersunk holes. To prep this chassis you will need to file the battery slots to keep from cutting the insulation labels on the batteries. This will also allow the battery pack to sit lower in the chassis, lowering the center of gravity.



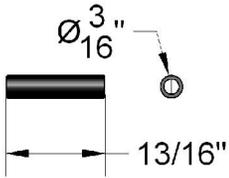
When filing the slots, file from the top side of the chassis with the file at a 45° angle. Have an assembled 4-cell battery pack handy to check depth as the chassis is filed. Removing too much material will allow the battery pack to sit too low and could rub on the ground in high speed corners.

After filing, the slots should look something like the illustration to the right. If you filed the slots too low and the battery sits lower than the bottom of the chassis, they can be built back up slowly using multiple layers of thick cyanoacrylate (CA) glue.





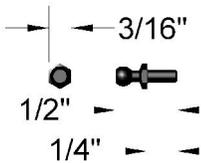
4-40 hex nut small



Tweak plate and battery strap stand-off

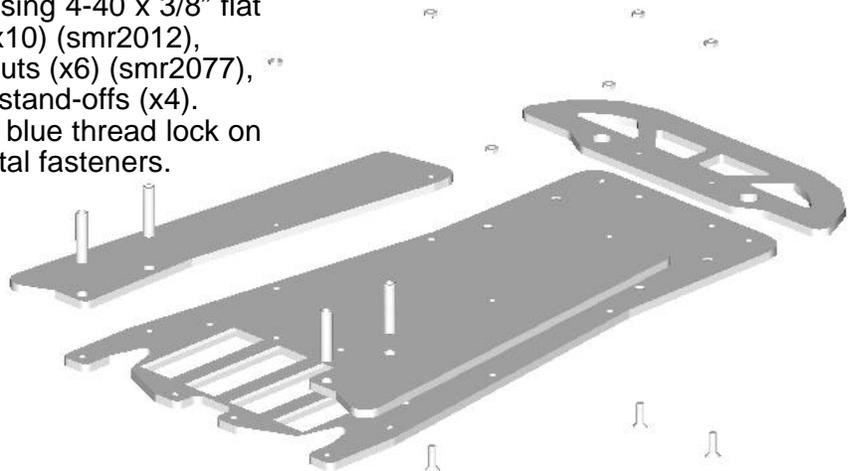


Antenna/shock mount

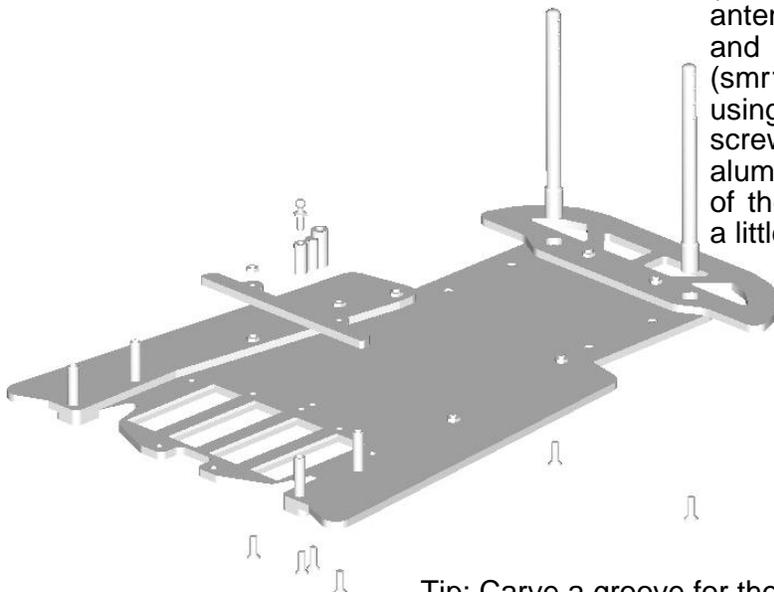


Aluminum ball stud

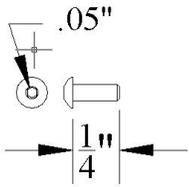
Next assemble the chassis components, using 4-40 x 3/8" flat head screws (x10) (smr2012), 4-40 thin hex nuts (x6) (smr2077), 4-40 threaded stand-offs (x4).  
Tip: use a little blue thread lock on all metal to metal fasteners.



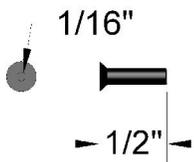
Continue assembly adding battery positioning plate using 4-40 x 3/8" flat head screws (x2) (smr2012) and 4-40 small hex nuts (x2) (smr2076). Attach the antenna mount (smr1432) and front body mounts (smr1551) to the chassis using 4-40 x 3/8" flat head screws (x2). Install 4-40 aluminum ball stud into rear of the antenna mount using a little CA glue to secure it.



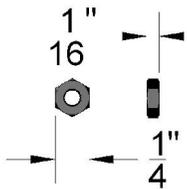
Tip: Carve a groove for the antenna wire underneath the shock mount (long side) to pass the antenna wire up through the antenna tube. Be sure it's large enough not to pinch the wire.



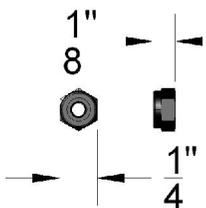
2-56 x 1/4"  
button head



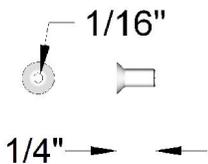
4-40 x 1/2"  
flat head



4-40 large  
hexnut

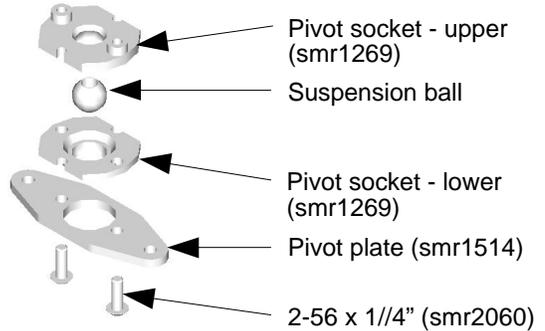


4-40 large  
locknut

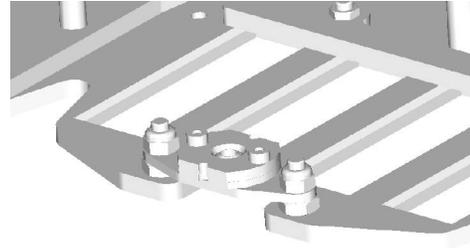
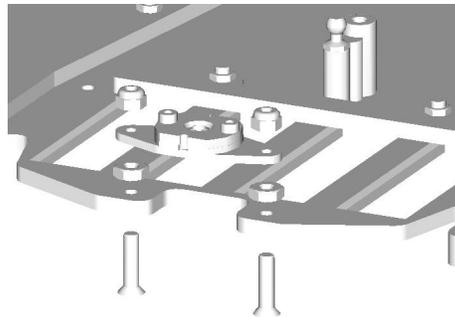


4-40 x 1/4"  
flat head

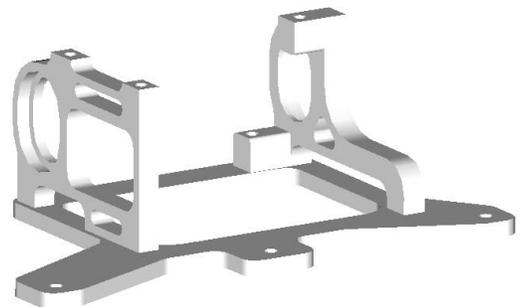
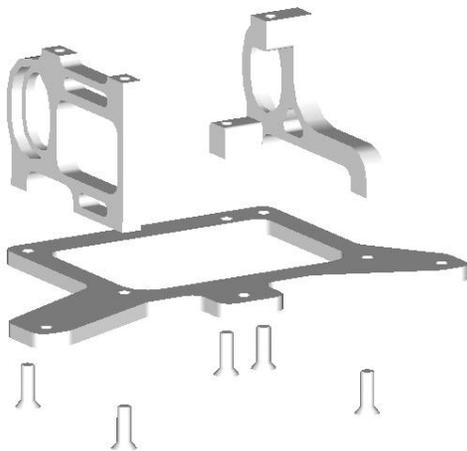
Assemble the center pivot plate with the pivot socket set (smr1268), in the configuration shown, fastening with 2-56 x 1/4" button head screws (x2).

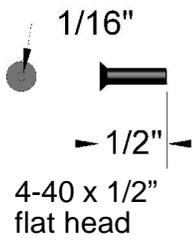


Attach to the chassis 4-40 x 1/2" flat head screws (x2) (smr2014) with 4-40 hex nuts (x2) (smr2078). Slide center pivot assembly onto the 4-40 screws and secure with 4-40 lock nuts (x2) (smr2082).

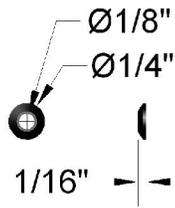


Attach the left and right bulkheads to the lower pod plate with 4-40 x 1/4" flat head screws (x5) (smr2010).



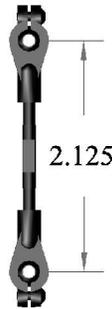
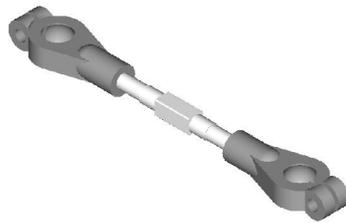
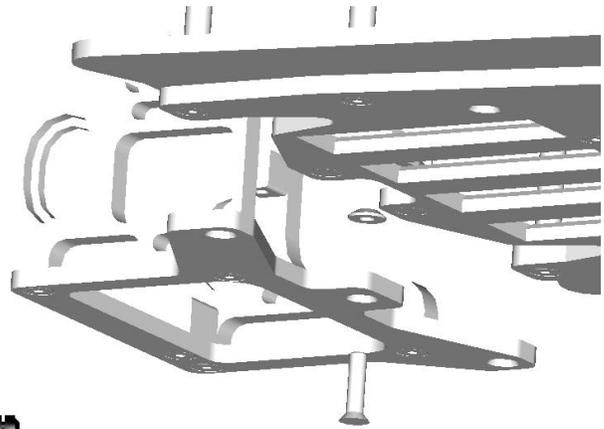


4-40 x 1/2" flat head

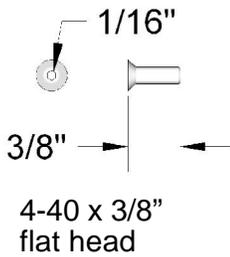


Low roll center cone

Attach rear pod to the main chassis using a 4-40 x 1/2" flat head screw (smr2014). Use a low roll center cone (SMR5008) on top of the lower pod plate, screwing through the 1/4" x 4-40 suspension ball in the center pivot. Secure with 4-40 mini-locknut (SMR2080).

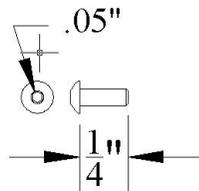
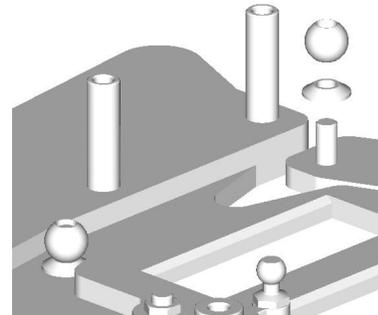


Assemble the side links from the Link Set (smr1264), screw onto each end of the turnbuckles one of the captured link ends (smr1265-s). Space the plastic captured link ends equally 2-1/8" apart from center to center. This will get the link close, and will be fine-tuned later.

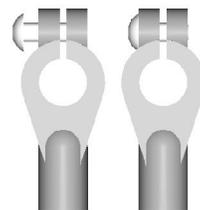
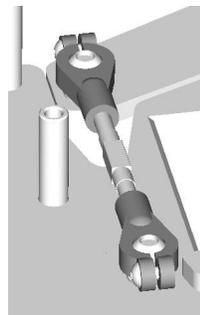


4-40 x 3/8" flat head

Next, place two 4-40 x 3/8" flat head screws (smr2012) through the chassis and lower pod plate. From the top of the chassis, place one low roll center cone (smr5008) on each of the screws, followed finally by a 1/4" x 4-40 suspension ball screwed down tightly using a small amount of blue thread lock.

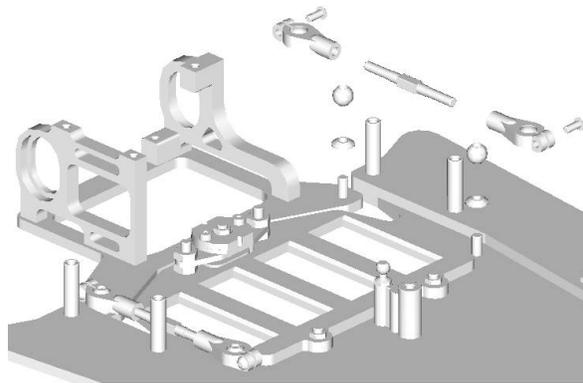
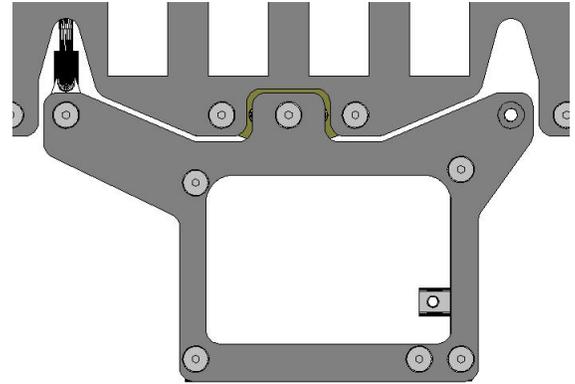


2-56 x 1/4" button head

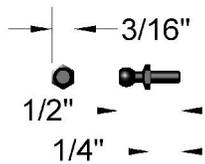


Next, attach only one of the link assemblies to the suspension balls on the chassis. Screw in the 2-56 x 1/4" button head screws (smr2060) until they just bottom on the captured link ends. It is extremely important that the captured link ends do not bind on the 1/4" x 4-40 suspension balls.

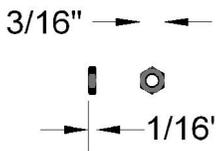
Holding the chassis and lower pod plate level, examine the gap between the main chassis and the lower pod plate from the bottom. The gap should be even all the way across. Make adjustments to the single attached link until the gap is even.



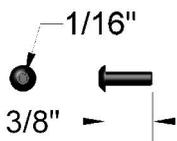
Next, place two 4-40 x 3/8" flat head screws through the chassis and lower pod plate on the opposite side. From the top of the chassis, place one low roll center cone on each of the screws, followed finally by a 4-40 threaded ball screwed down tight. Next attach the second link to the opposite side using the same method as before.



Aluminum ball stud



4-40 hex nut small



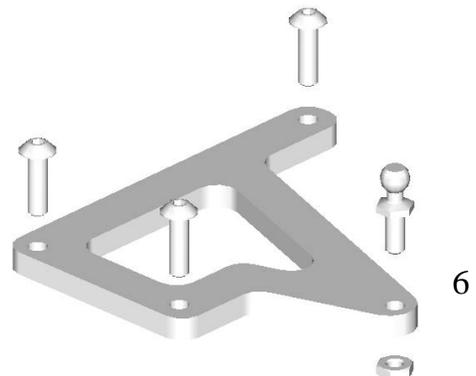
4-40 x 3/8" button head

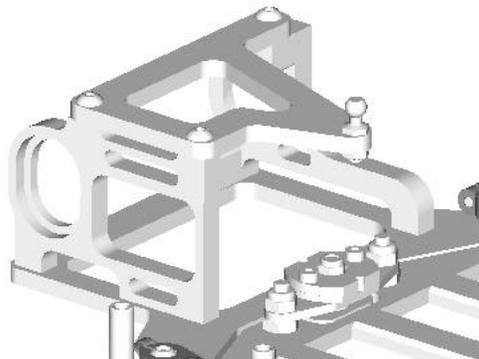
Articulate the rear pod, twisting it left and right, noting the feeling of the motion. The method for fine adjustment for the different actions are as follows:

- If the motion on one side feels 'clicky', then the link on that side of the pod is too long.
- If the motion on one side of the pod feels 'tight', then that side link is too short.

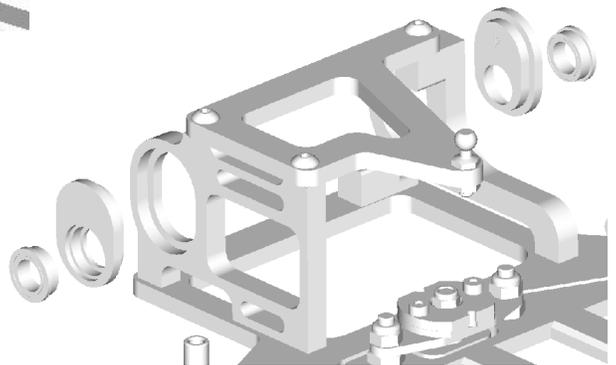
The twisting motion from side to side of the rear pod is really important to get correct. If not adjusted correctly, it will lead to an ill-handling car.

Locate a 4-40 aluminum ball stud (smr2070) and 4-40 minihex nut (smr2077), installing in the front of the top plate as shown. Then find three 4-40 x 3/8" button head screws (smr2032).

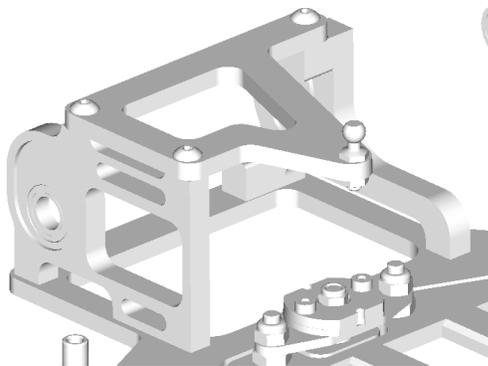




Locate two No. 4 axle ride height adjusters (smr1293), and two 3/8" x 1/4" bearings (smr5001) and install them into the rear pod. Orientate the axle ride height adjuster so that the bearing is in the low position.



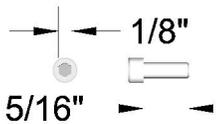
Attach the upper pod plate to the bulkheads already attached to the lower pod, do not use thread lock on these screws. To install a motor (not included) into the rear pod, the top plate will need to be removed, and the motor installed with the pinion shaft side first, pivoting the rear of the motor into place.



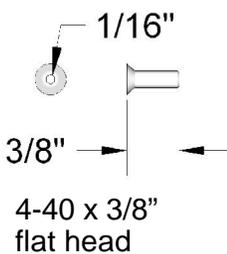
Tip: Sometimes the axle ride height adjusters have flashing around the edges that will need to be trimmed. This is left on from the molding process, and can ensure that a good fit is possible. Trim the gate off with a hobby knife and test fit in the milled opening. Only sand enough material off till the parts just slide in.



Tweak spring holder (top/bottom)



4-40 x 3/8" socket head



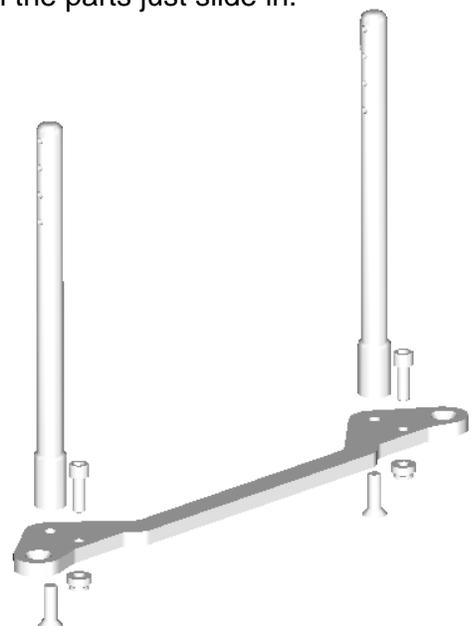
4-40 x 3/8" flat head

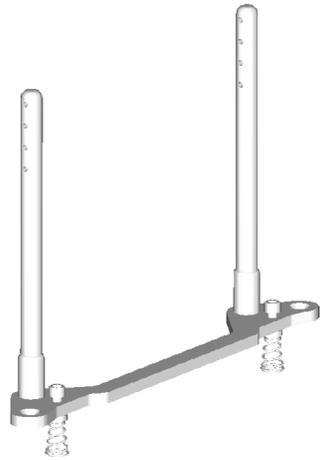
Locate the following items:

Body posts (smr1551)(x2), 4-40 x 3/8" flat head screws (smr2012)(x2). The Tweak spring carriers (smr1279): 4-40 x 3/8" socket head cap screws (x2), and Tweak Spring Holders (x2). Also the Tweak Springs (x2) (smr5062). And the Tweak Plate.

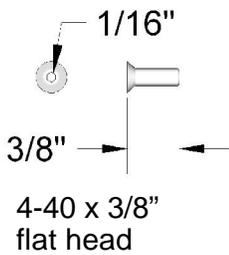
The top side of the Tweak Plate has the counter sunk holes on the outside edges facing up. Install the socket head cap screws from the top side, threading into the non-countersunk holes. Next, apply a small amount of CA glue to just the end of the screws and screw the Tweak Spring Holders until the end of the holder is even with the end of the screw.

Next install the body posts into the holes adjacent to the Tweak Screws.



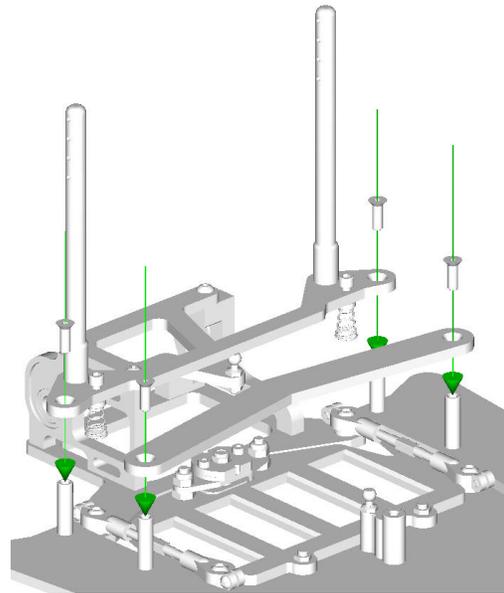


Install the tweak springs, only after the CA glue has fully cured, by pushing and twisting the spring in a clock-wise motion until it 'clicks' into position.

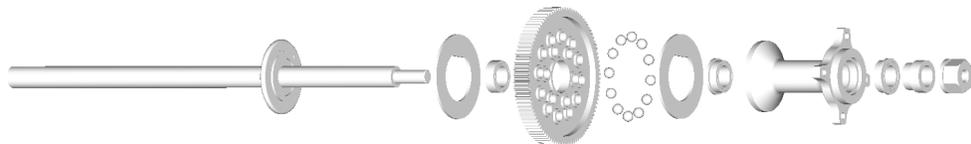


Assemble the tweak plate to the chassis using 4-40 x 3/8" flat head screws (smr2012)(x2) and a little drop of blue thread lock.

Next locate the battery hold down plate and install with 4-40 x 3/8" flat head screws (smr2012)(x2). Note: no thread lock here!



Find the parts bag containing the rear axle and differential (diff) parts.



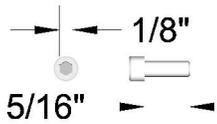
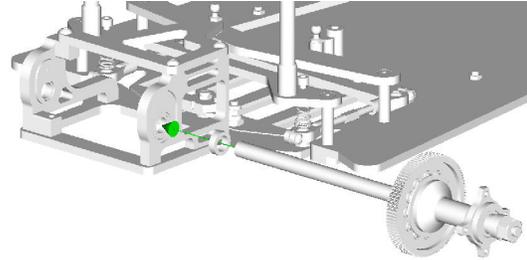
From left to right shown above is; the rear axle, diff ring, 3/8" x 1/4" un-flanged bearing, 100 tooth spur gear, 1/8" diff balls (x12), diff ring, 3/8" x 1/4" flanged bearing, right hub, 3/8" x 1/4" flanged bearing, thrust cone, nylon diff nut.

These components will be installed in that order. Silicone diff grease should be used on the balls after installation into the spur gear (both sides).

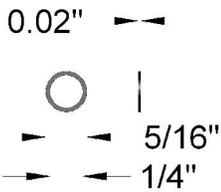
Tip: to aid in the assembly, put 3 to 4 dots of grease on the axle flange, and on the right hub before mounting the diff rings. This will hold the rings in place until the assembly is completed.

When tightening the diff nut, tighten it down slowly until it just starts to tighten the diff. From this point on, only tighten 1/4 turn increments, spinning the axle while holding the spur from turning. This will allow the diff to break in slowly. Keep tightening the diff nut until it's difficult to spin the spur while holding the axle and right hub firmly.

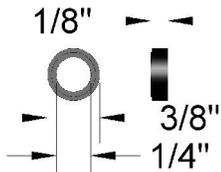
After assembling and breaking in the differential, install the axle into the rear pod through the right side bulkhead. Slide all the way through until the hub on the diff flange is touching the bearing.



4-40 x 3/8"  
socket head



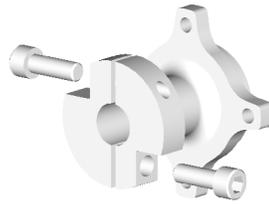
1/4" axle shim



1/4" stepped  
axle shim

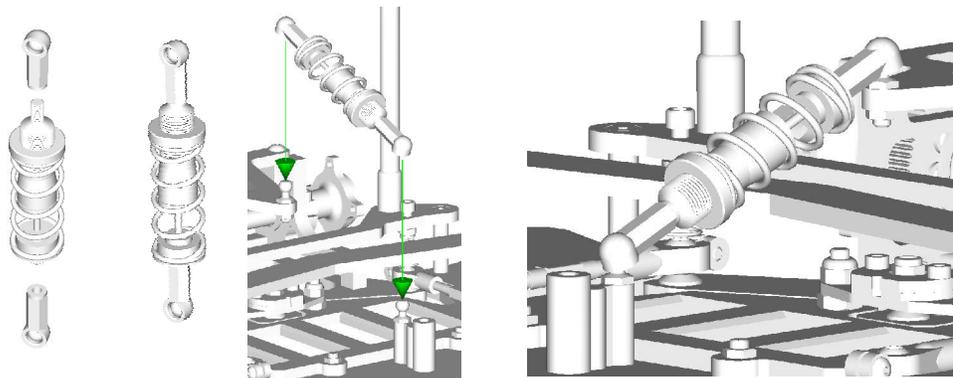
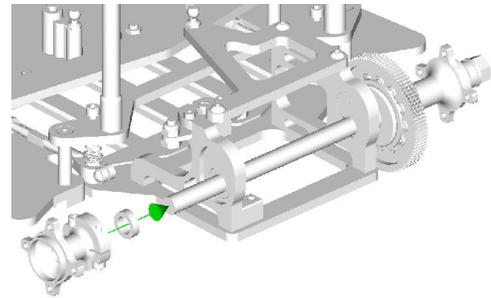


Ball cup



Install 4-40 x 3/8" socket head cap screws (x2) into the left rear axle hub, and do not tighten.

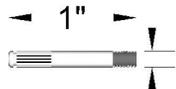
Slide three 1/4" axle shims (smr2090), and the stepped spacer onto the axle to the bearing, followed by the left hub assembly completed in the step above. Leave a hair gap between the axle spacer and then tighten the two socket head cap screws



Assemble the rear shock absorber following the manufacturer's instructions, 45 weight silicone shock oil is a recommended starting point. After trimming the flashing off the ball cups (x2)(smr1423), thread them all the way onto the threaded ends of the shock. Install an o-ring on each ball stud, and attach the shock as shown, by pushing down firmly on the ball cup over the ball stud.

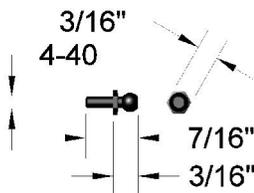


E-clip

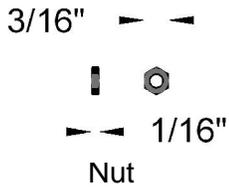


Ø 1/8"

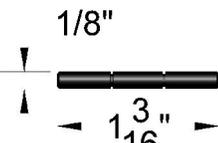
Axle



Short Neck Ballstud



Nut



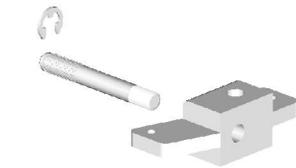
Kingpin



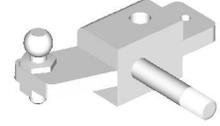
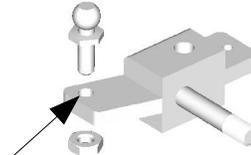
Front Spring

Note: it is recommended to wear safety glasses when installing E-clips.

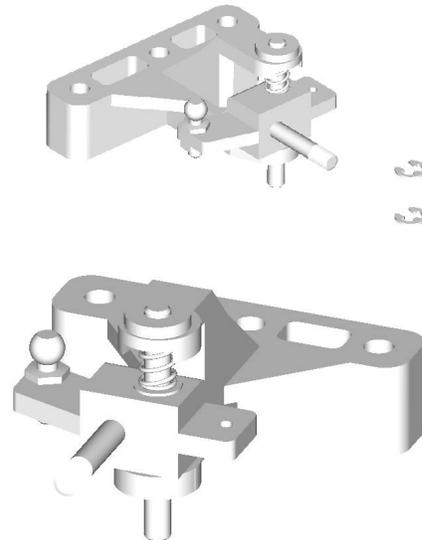
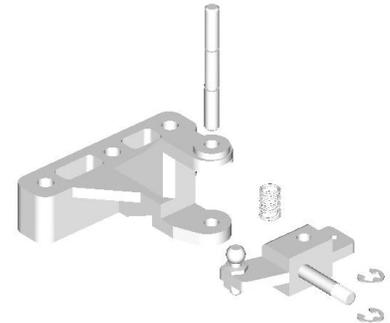
Find the steering knuckles (smr1281)(x2), front axles (smr1289)(x2) and E-clips (smr2092)(x2). Install an E-clip into the groove on the axle, then press fit the axle into the steering block threaded end first. Press the axle all the way through the steering block till the E-clip bottoms on the steering block. Using a 3/32" drill, open the indicated hole on the tabs of both steering blocks. Thread in the short neck ball studs (smr2069), secured by 4-40 mini-hex nuts (smr2076), use thread lock on the stud.



Drill 3/32" hole

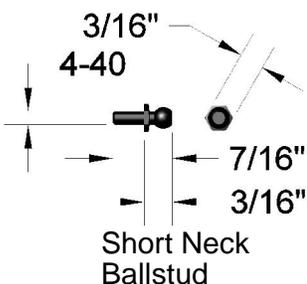
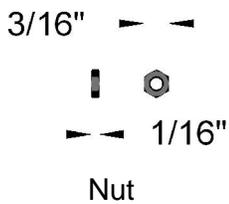
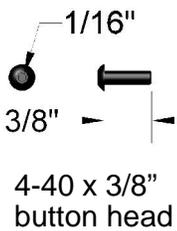
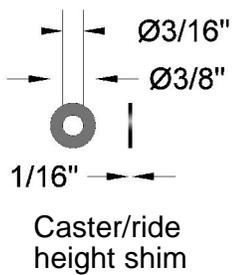
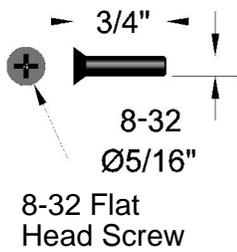


Noting the bump on the front of the suspension arm (smr1289)(x2), install the steering knuckle with the ball stud located toward the rear. Start by installing the kingpin (smr1282)(x2) through the top of the suspension arm, just enough to slide the .022" spring (smr1286) onto. Next position the steering knuckle as mentioned above. Slide the kingpin down carefully, taking care not to catch the spring in the E-clip grooves. Tip: Polish the kingpins before installing using some metal polish for smooth operation.



When installing E-clips (smr2092), ensure the groove in the kingpin is aligned with the top of the steering knuckle. Slide the first E-clip between the knuckle and spring, firmly snapping it into the groove.

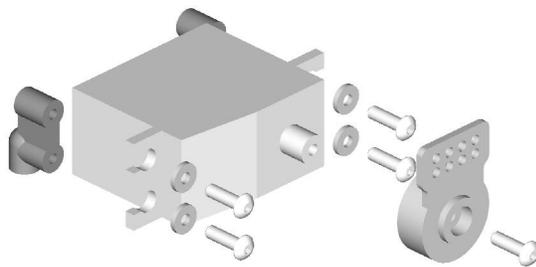
With the top E-clip installed, installing the bottom E-clip is as simple as sliding it between the steering block and lower part of the suspension arm with the clip started on the groove. Now, let the suspension relax. Holding the knuckle in place, use the back side of a hobby knife blade to snap the E-clip into place.



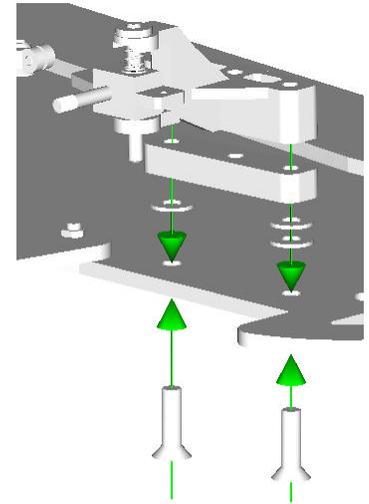
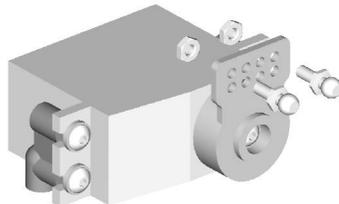
With two 8-32 x 3/4" flat-head cross-point (phillips-head) stainless steel screws (smr2045), mount one ride height/caster shim (smr2089) toward the rear-most hole, and two ride height/caster shim on the screw in the front. Pass these screws through the plastic suspension arm spacer, and firmly screw down the front suspension arm.

Tip: the bump on the suspension arm faces the front of the chassis.

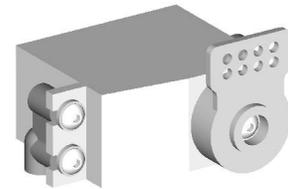
Repeat the process for the opposite side.



With the servo orientated in the direction shown, assemble by passing the 4-40 button head screws through the #4 washers, screwing firmly into the servo mounts through the mounting ears on the servo case. Be sure to not over tighten these screws. The bottom of the servo mounts should be even with the bottom side of the servo.

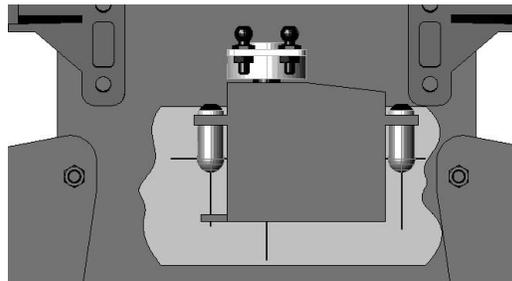
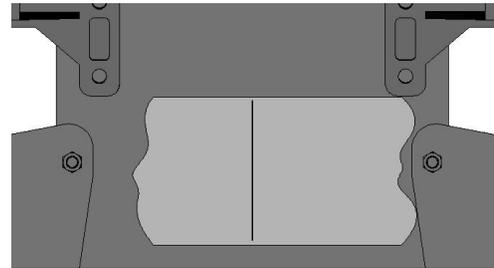


To install your steering servo (not included), find the servo mounts (smr1430)(x2), 4-40 x 3/8" button head screws (smr2032)(x4), #4 flat washers (smr2088)(x4), and a servo saver that matches your servo (not included). Make sure to retain the screw that came on the splined output shaft of the servo to attach the servo saver.



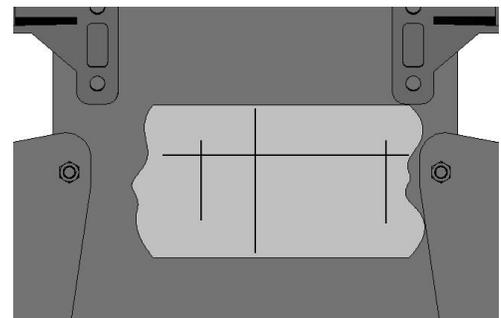
Install two short neck ball studs (black) in the upper-outer most holes on the servo saver. After putting a drop of thread locker on the threaded end of the ball stud, thread on 4-40 mini hex nuts (x2).

Because every servo is slightly different in size, drilling mounting holes for the servo is left to the builder. To locate the holes to mount the servo, place a piece of masking tape just behind the suspension arms as shown. Locate the center of the chassis on the tape, and draw a line from front to back as shown.

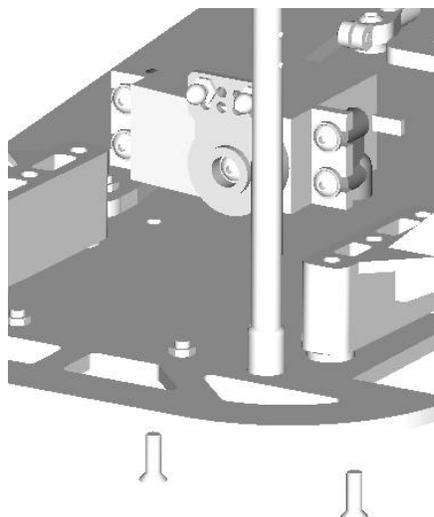
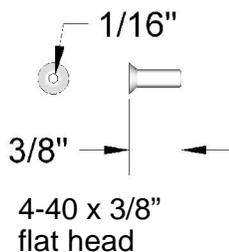


Place the servo assembly on the chassis. Use the line drawn to center the servo saver on the chassis, as far forward as possible. Be sure to have the servo as square to the chassis as possible, too. Locate on the tape, the holes to mount the servo.

The line drawn across the chassis should be the same line for both holes, as the servo should be mounted square to the chassis. Drill two 1/8" holes, and countersink the holes from the bottom side of the chassis with an 82° countersink until the 4-40 x 3/8" flat head screws (x2) sit flush with the bottom of the chassis.

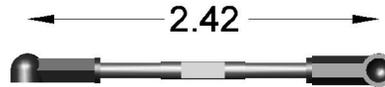


Tip: pilot drill the holes slowly with a smaller drill bit to help locate the holes more precisely, this will keep the larger drill bit from 'walking' away from the intended location.

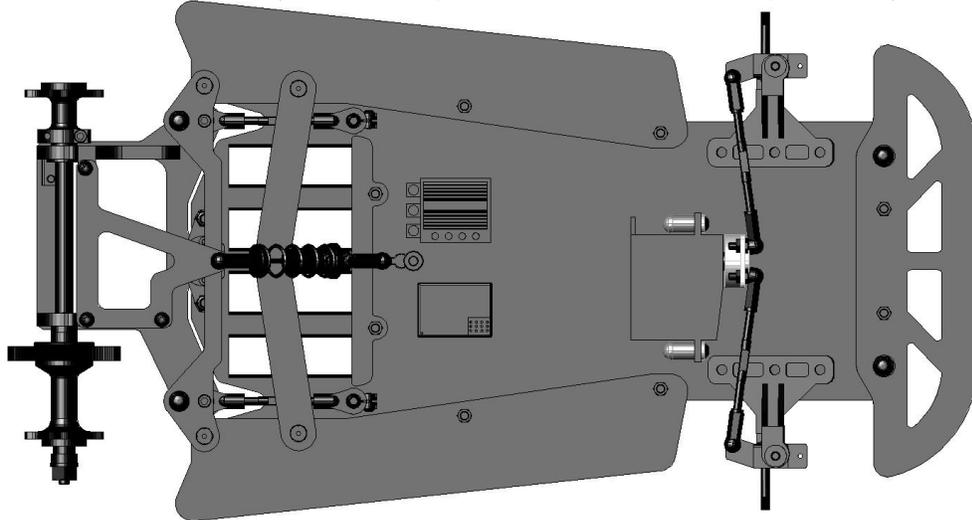


After removing the tape, use the countersink tool to slightly chamfer the top sides of the newly located holes. This will remove any burrs and give the holes a finished look. Install the servo assembly with 4-40 x 3/8" flat head screws (smr2012)(x2). Be sure not to over-tighten them.

Using the remaining plastic ball cups (x2)(smr1423) and 4-40 turnbuckles (x2)(smr1297), assemble them into the steering linkage as shown below, paying attention to keeping the turnbuckle equally threaded into the ball cups. This will allow adjustment without the danger of bottoming the turnbuckle inside the ball cup. The dimension shown is to get the length roughly the correct length. Shown is the left hand turnbuckle, the right hand will have the ball cup on the right facing away from you. Fine tuning of the linkage will have to be completed when it is assembled on the model.



After installing the linkage onto the chassis, it should appear as shown below. The remaining hardware is for mounting the front wheels: 1/8" x 5/16" flanged bearings (x4)(smr5003) to be mounted into the front tires of your choice, 4-40 mini lock-nuts (x2)(smr2080) used to secure the front wheels to the front axles. Tip: be sure when tightening the front wheel nuts not to crush the bearings. The nuts should just touch the inner bearing race with the wheel seated flush against the steering block. To test for over tightened nuts, spin the wheel while tightening the wheel nut. When the nut causes the wheel to slow, back the nut off until there isn't any more compression and the wheel spins freely.



More remaining hardware is as follows: 4-40x 1/2" socket head cap screws (x8)(smr2024). These are used for mounting the rear tires of your choice. Tighten these till the screws are firmly secured. Over tightening will cause the rims to deform and not run true. It could also lead to premature rim failure.

Installing the electronics using the layout shown has proven to be the most efficient layout. This allows the positive wires to go to the battery on the left side, then straight back to the motor (non-reversing ESC). The negative battery lead to the right, while the motor negative goes straight back. Tip: route the motor wires down the centerline of the car, following the shock. This will keep from imposing tweak between the motor pod and main chassis.