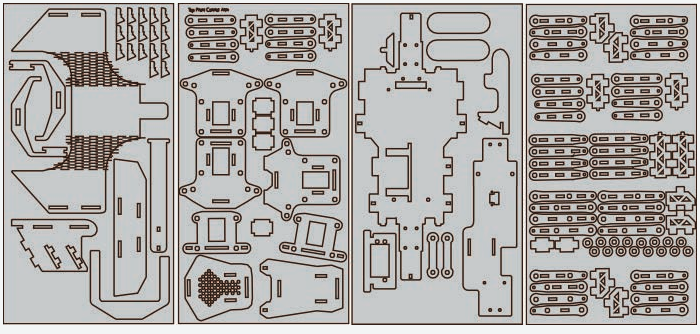
Built for Speed

Wooden RC Car Making Kit

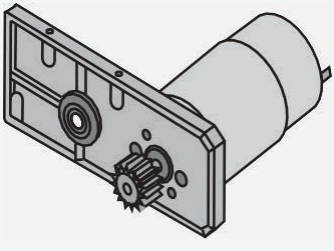
MAN CRATES PROJECTS

COMPONENTS PT. 1

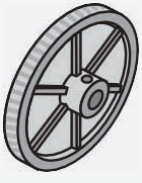
Everything needed to build your Wooden RC Car



Lasercut Wooden Frame



Brushed Motor with Mounting Plate



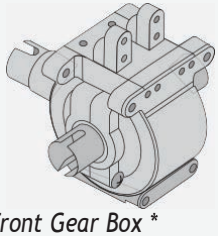
Great Gear

2.6 X 12 mm Screws

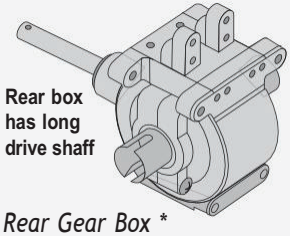
Connection Cup

Half Screws

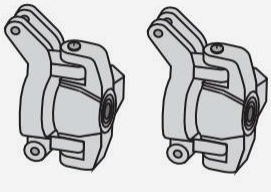
Drive Shaft



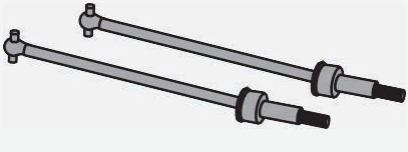
Front Gear Box *



Rear Gear Box *



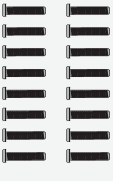
Front Steering Cups



Front Axles

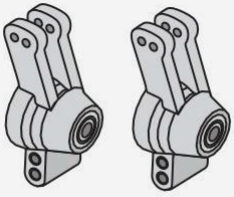
Axle Pins

Hex Adapters

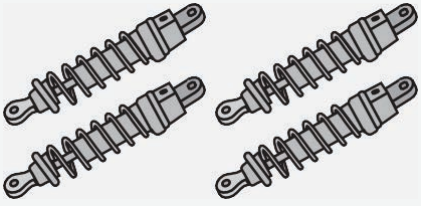


3 x 12 mm Screws

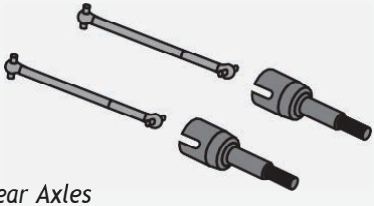
* *note: some versions of this kit had the gear boxes misslabeled. Check against this diagram to verify.*



Rear Steering Cups



Shock Absorbers

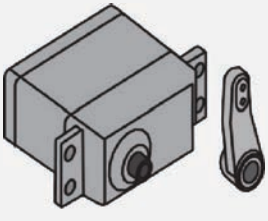


Rear Axles

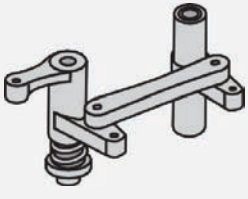
Axle Pins

Hex Adapters

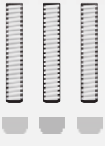
Axle Locking Nuts



Steering Servo Assembly



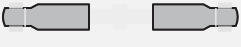
Steering Assembly



3 x 25 mm
Screws & Nuts

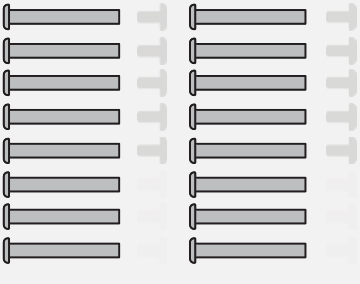
4 x 60 mm Screws & Nuts

Steering Rod



Short Rod

2.5 X 10 mm
Rod Screws



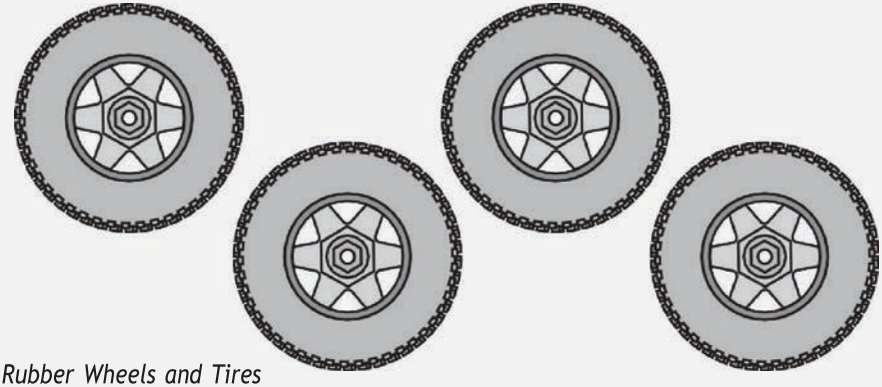
5 x 40 mm Binding Posts

5 x 10 mm
Binding Posts

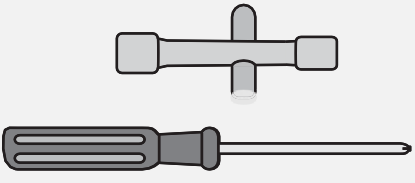
2.6 x 10 mm
Screws

COMPONENTS PT. 2

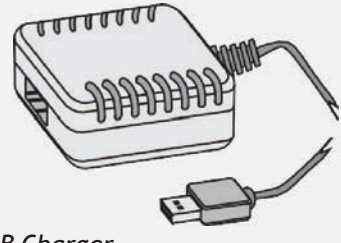
Everything needed to build your Wooden RC Car



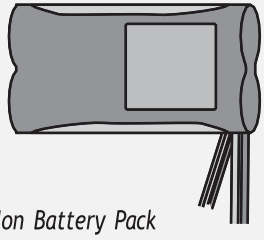
Rubber Wheels and Tires



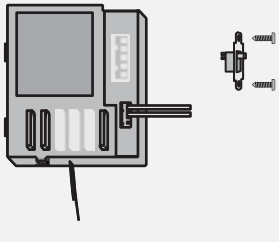
Combo Wrench and Screwdriver



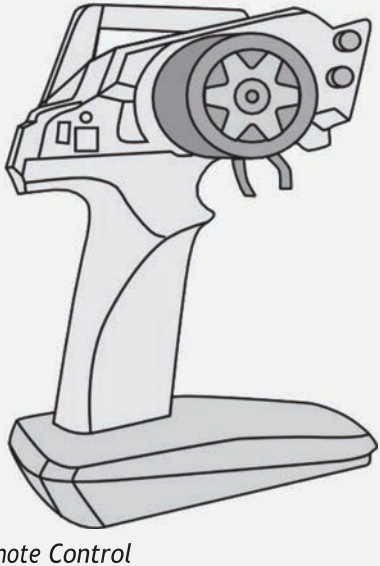
USB Charger



Lithium Ion Battery Pack



Receiver and Switch (with Screws)



Remote Control

The Parts

You'll be building a 1:12 scale RC car with four wheel drive, suspension, and a sleek wooden frame that'll turn heads and maybe break necks with its 30 mph top speed.

It can drive forward or backward with a powerful brushed motor and lithium-ion battery, and the two gear boxes and steel drive shafts provide four wheel drive for optimal traction. Each wheel is independently suspended with adorable, little shock absorbers, and the servo motor and adjustable steering rods can fine-tune the steering for tight control.

We've also included some extra hardware for any repairs your car may require. Because once you get it going, you're going to want to test its limits.

And to tame your speed demon, the radio receiver mounted in the car connects to a remote controller powered by four AA batteries.

The Frame

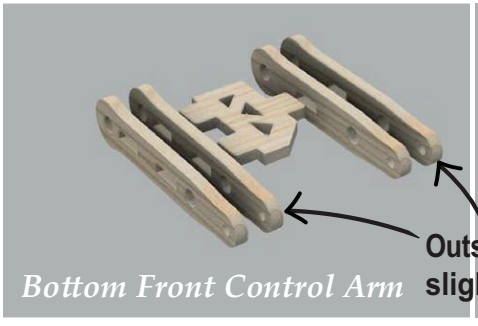
We've designed the frame and body of your RC car fully out of wood. You'll be assembling over 100 parts laser-cut for a perfect fit from 3 mm baltic birch veneer plywood. We've also included replacement control arms, the parts most likely to break in case of a crash.

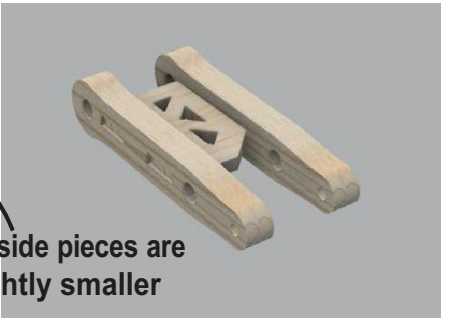
This project takes on average ***5 hours*** *to complete*

You might also need: *wood glue, cotton swabs, needle nose pliers, sandpaper, tape, paint or wood stain, and 4 AA batteries.*

CONTROL ARMS

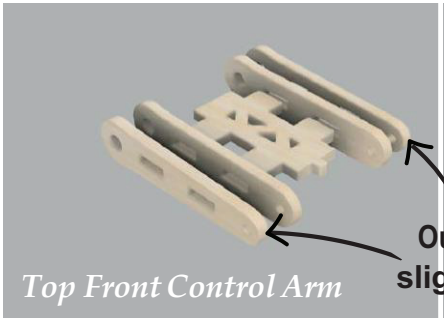
Mounting the legs to the bottom





Outside pieces are slightly smaller

Bottom Front Control Arm



Outside pieces are slightly smaller

Top Front Control Arm

Top Rear Control Arm

Bottom Rear Control Arm

1. Pop out the ***Suspension Control Arms*** one section at a time (Fig 1). As you assemble, use wood glue to bond the parts together permanently for extra strength (Fig 2).

2. Follow the diagram on the left to assemble all control arms. You should have two of each type for a total of eight arms (plus spares). Let glue dry for half an hour.

   For the ***Top Front*** and ***Top Rear*** control arm, half the piece ends are smaller than the others. Make sure these go on the outside.


Fig 1


Fig 2


Fig 3

Pro Tip:
Quickly clean up any glue that squeezes out to prevent the round cutouts from getting blocked. We recommend cotton swabs.

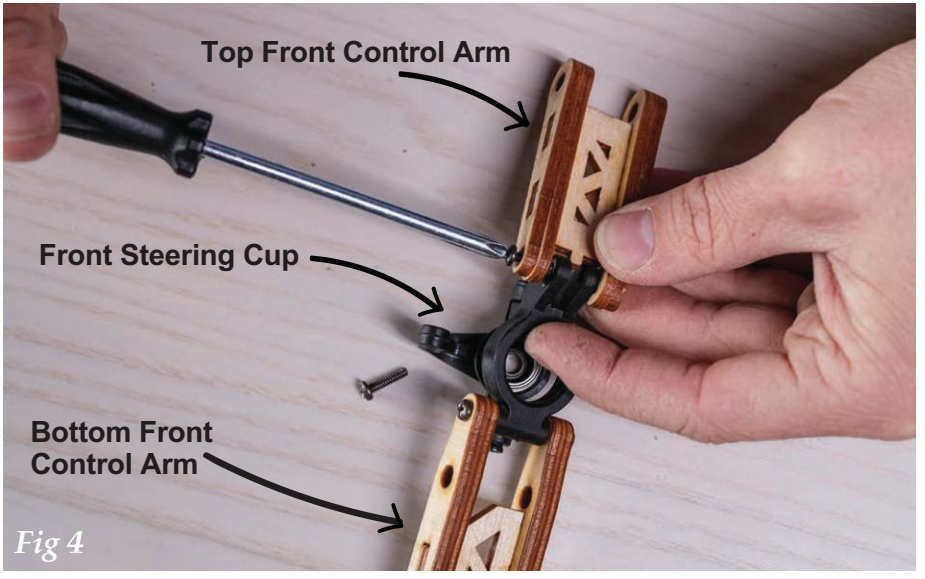


Fig 4

3. Find the ***Front Steering Cups.*** Using the ***3 x 10 mm Screws*** that came with them, attach a ***Top Front and Bottom Front Control Arm.*** Tighten screws snug, but ensure the arms can pivot easily (Fig 4). Repeat process for the second set.

4. Repeat the same steps to attach the ***Rear Control Arms*** to the ***Rear Steering Cups*** using the same ***3 x 10 mm Screws*** (Fig 5). Repeat process for the second set.

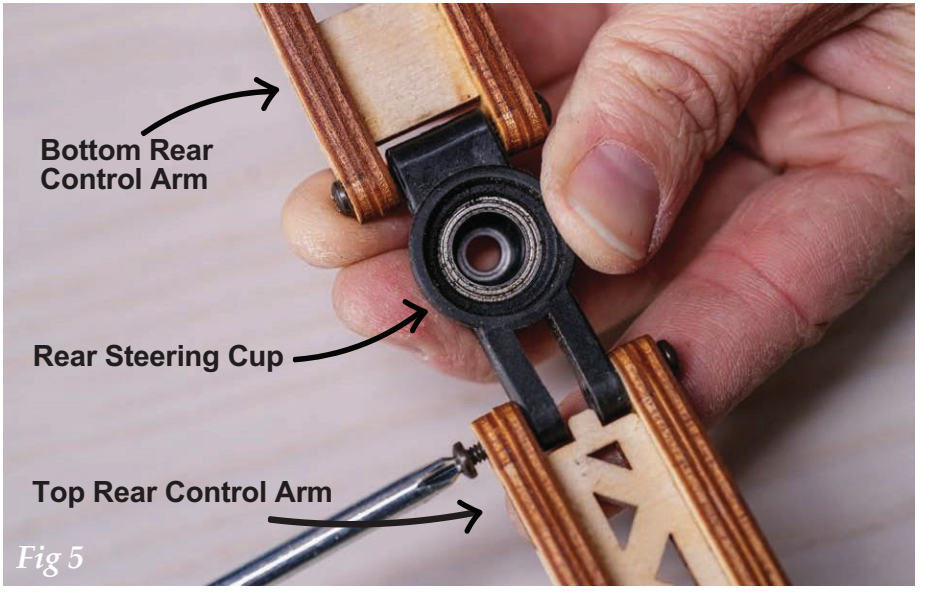


Fig 5

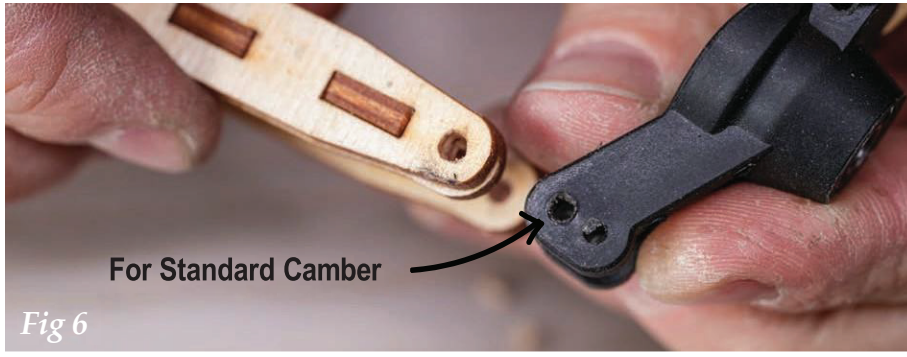


Fig 6

The Steering Cups have two screw holes to adjust the Camber, the angle of the wheels. We recommend the inside hole for standard tuning.

5 Seat the ***Rear Axle*** into the ***Rear Steering Cup*** (Fig 7) and repeat for the second set.

Use the ***Front Axles*** with the ***Front Steering Cups***.

6 Once the threaded end of the ***Axle*** has been inserted, you'll see a hole near the threads. Slide an ***Axle Pin*** through this hole. These are essential parts, so be careful they don't slide out and get lost (Fig 8).

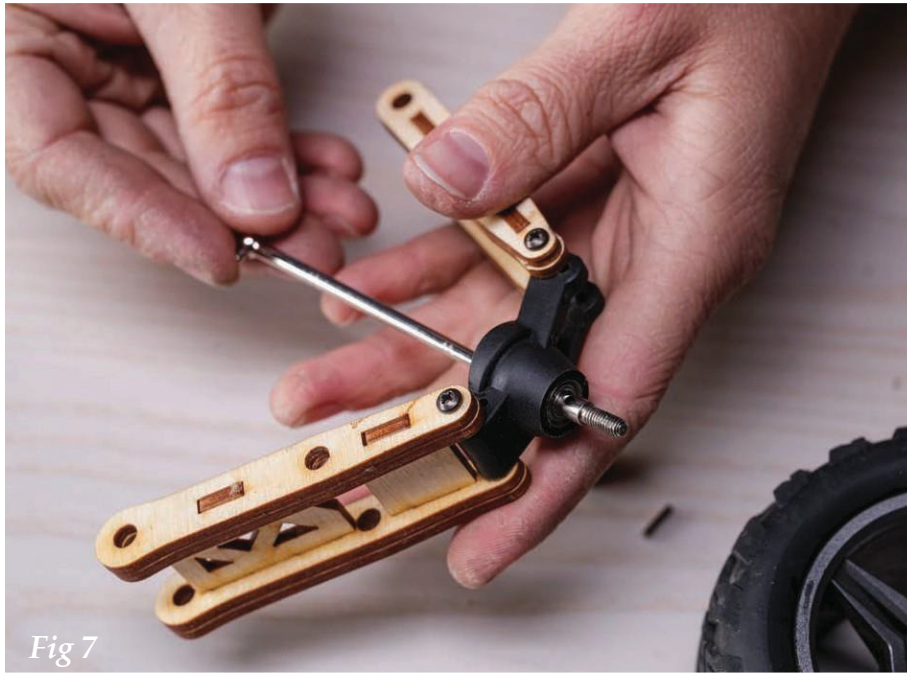


Fig 7

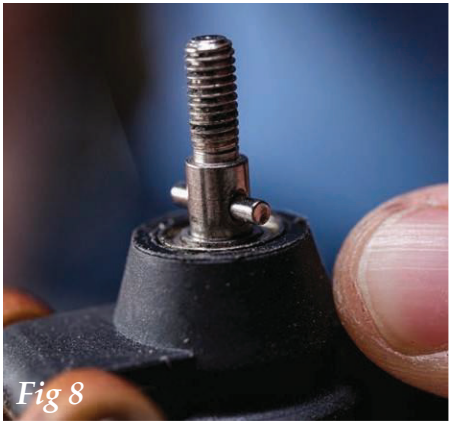


Fig 8

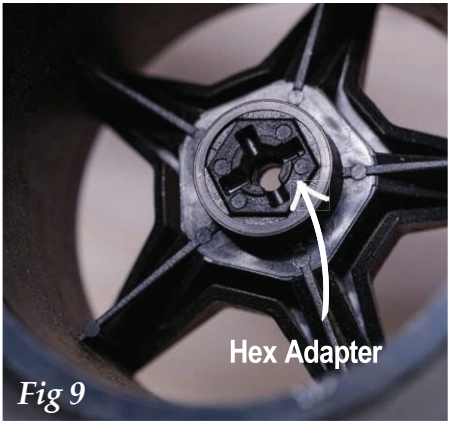


Fig 9

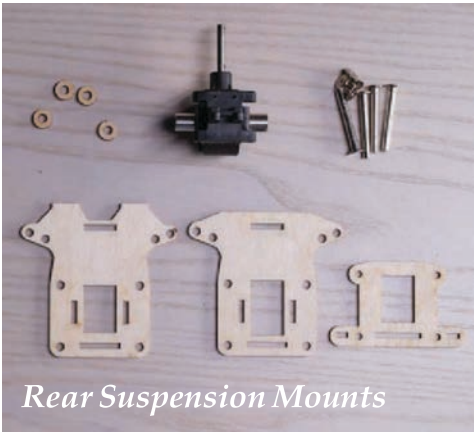
Fig 10

7 Insert the ***Hex Adapter*** into the tire rim (Fig 9), then carefully place the tire onto the axle so the axle pin inserts into the hex adapter slot. You'll know it's in when turning the tire also rotates the axle. Then, use an ***Axle Locking Nut*** to secure the tire to the axle (Fig 10).

Fig 11

SUSPENSION

Putting a little bounce in your buggy



Rear Suspension Mounts

Front Suspension Mounts

Once again, you'll be performing the same steps for the front and rear suspension assemblies. We'll walk you through the rear assembly, then just repeat the process for the front assembly.

1

Place the front of the ***Rear Gear Box*** through the ***A2*** wood piece. Seat the axle of one of your rear assemblies into the gear box, lining up the control arm and A2 holes (Fig 12).

2

Slide the ***35 x 40 mm Binding Posts*** through the A2 and control arm holes to join them (Fig 13). Use tape to hold the ends in place, then repeat for the other rear axle assembly (Fig 14).

Fig 12

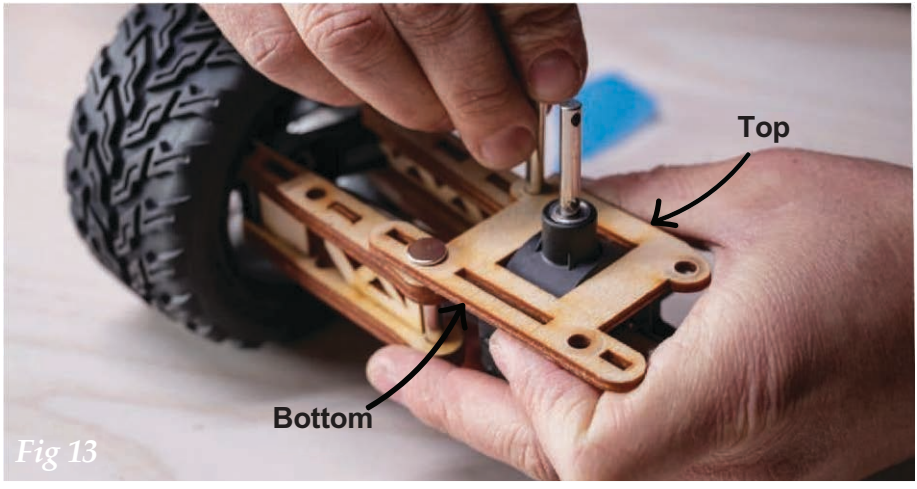


Fig 13

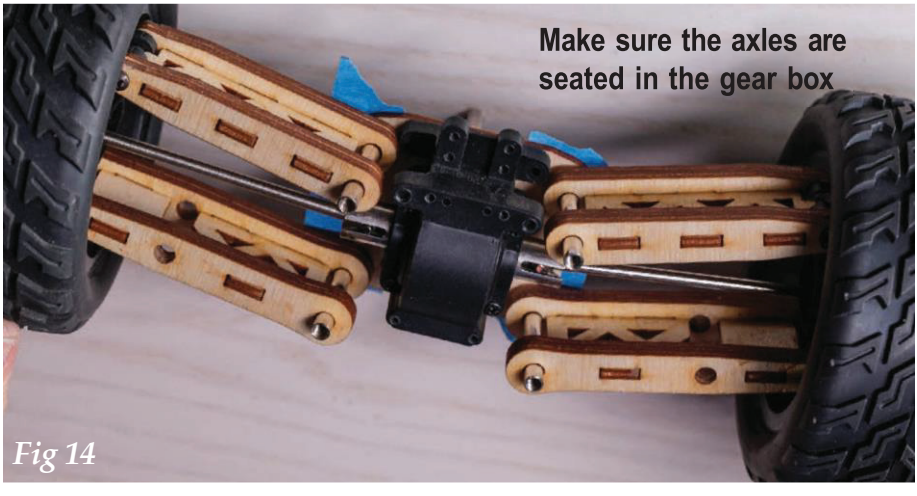


Fig 14

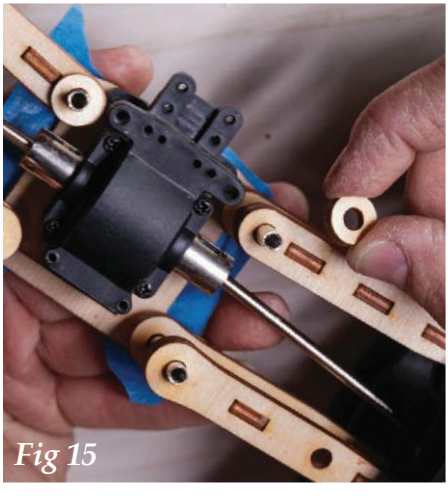


Fig 15

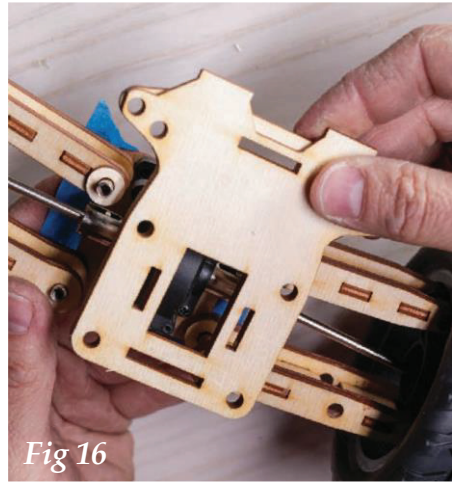


Fig 16

Fig 17

3

Place a small ***Wooden Washer*** over the top two binding posts (Fig 15), then place ***A3 then A4*** over the back of the gear box (Fig 16).
NOTE: For the front assembly, you'll use two ***A5*** pieces.

4

Ensure that both axle assemblies have the top control arms on top, then cap the binding posts (Fig 17).

5

Next, insert a new binding post through the bottom hole of a ***Shock Absorber***, then stack two wooden washers (Fig 18).

Fig 18

Fig 19

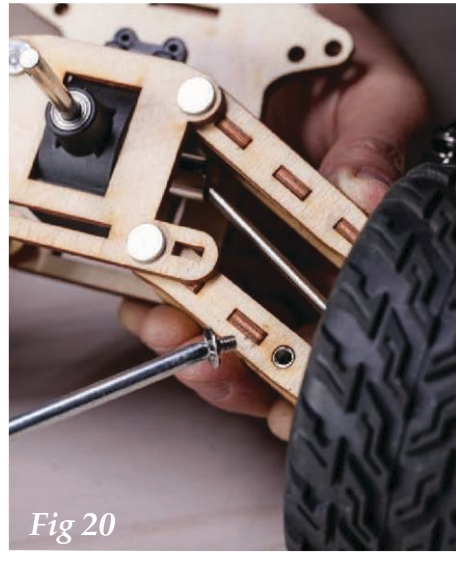


Fig 20

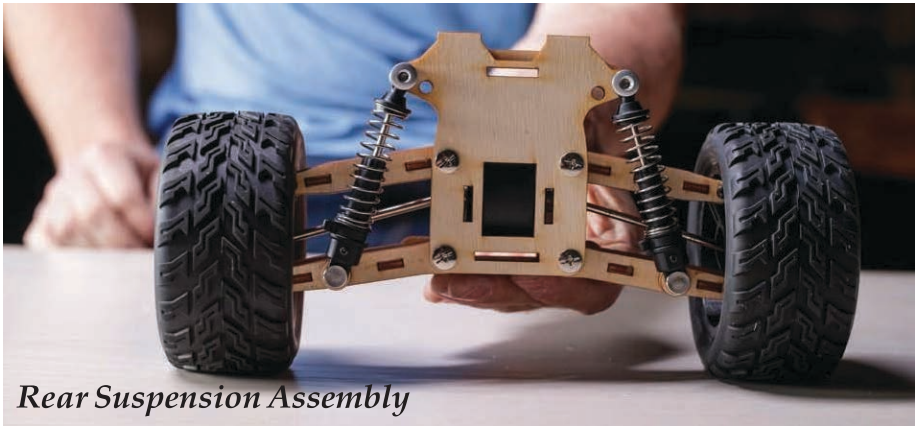
Fig 21

6

Insert the binding post through the holes in the bottom control arms, then screw the cap on to hold it in place (Fig 19, 20).

7

Finally, attach the shock absorber top to the mounting points on ***A3 and A4*** using the ***Short Binding Post*** (Fig 21). Repeat process for the second shock absorber.



Rear Suspension Assembly

Both Front and Rear Suspension Assemblies

MOTOR MOUNT

Making your car go vroom vroom!

1. Pop out the ***Car Frame*** and both ***B1*** pieces. Line up the holes of the B1 pieces with the rear of the frame, then sit the ***Motor*** on top. If there are plastic nubs on the mounting plate keeping it from sitting flat, trim them off with a razor blade.

2. Screw two ***2.6 X 14 mm Screws*** through the bottom of the frame into the motor mounting plate (Fig 22, 23).

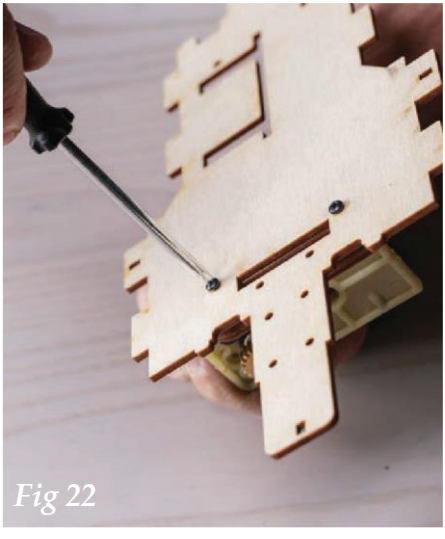


Fig 22

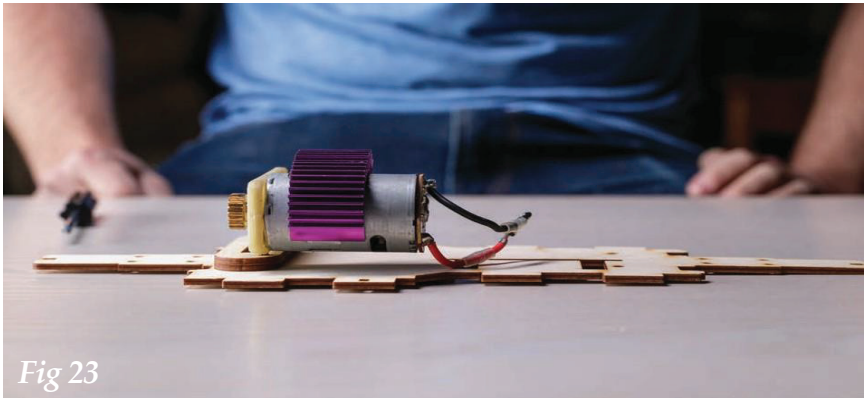


Fig 23

STEERING ASSEMBLY

Taming your speed demon

Fig 24

Fig 25

1. Slide the ***Steering Servo*** into the ***Servo Mount***. Angle it to get the cable through, then slide it the rest of the way (Fig 24, 25).
2. Insert the servo mount into the widest slot of the frame. Line up the grooves, then slide it in completely (Fig 26.
3. Mount ***B2*** onto the side of the frame in front of the steering servo. Use three ***3 x 25 mm Screws & Nuts*** to secure the steering servo in place (Fig 27). Use the wrench or pliers to hold the nut while tightening screws.
4. Insert two ***4 x 60 mm Screws*** through the bottom of the frame. Slide on **two *B3*** wood pieces, then drop on the ***Steering Assembly*** (Fig 28, 29). Then, place the last B3 piece on top.
5. Use two ***2.5 X 10 mm Screws*** to connect the ***Short Rod*** to the horn of the steering servo and horn of the steering assembly (Fig 30, 31).

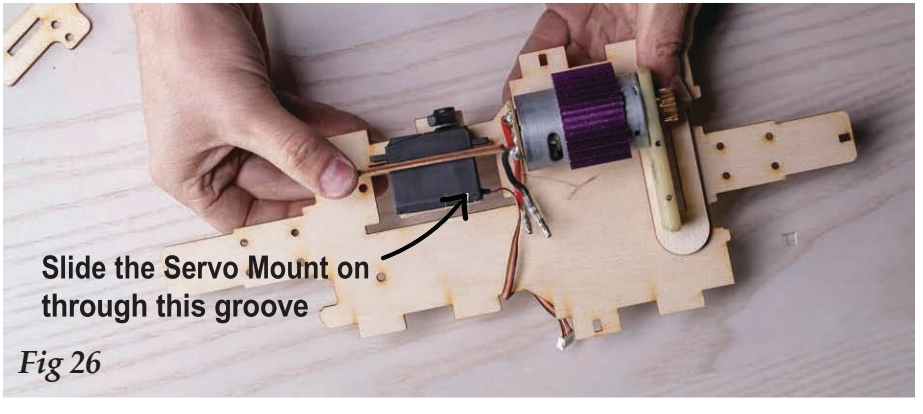


Fig 26

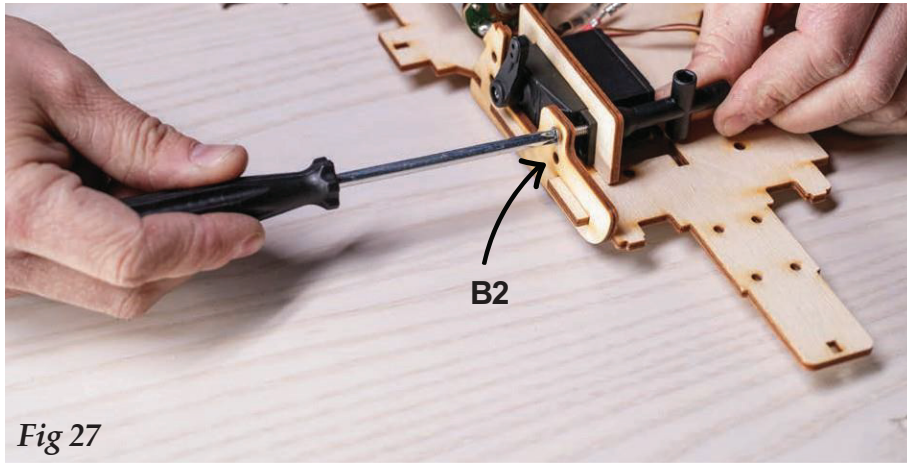


Fig 27

Fig 28

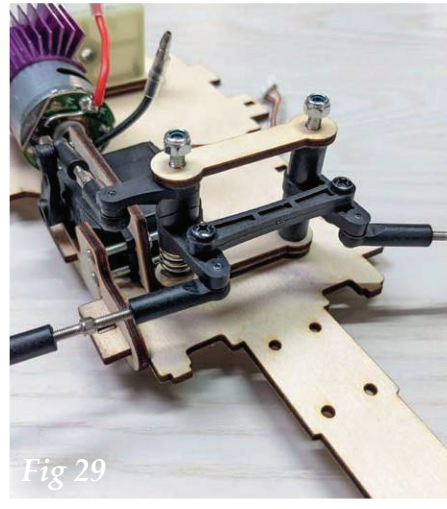


Fig 29

Fig 30

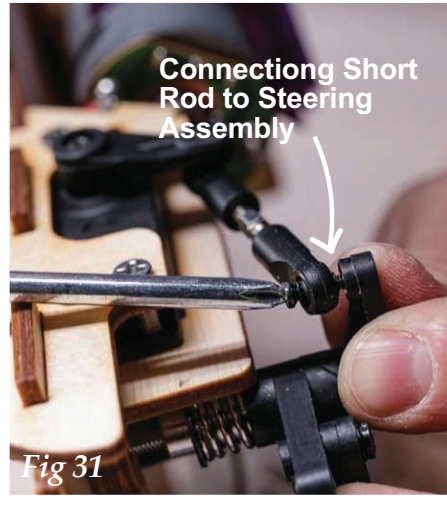


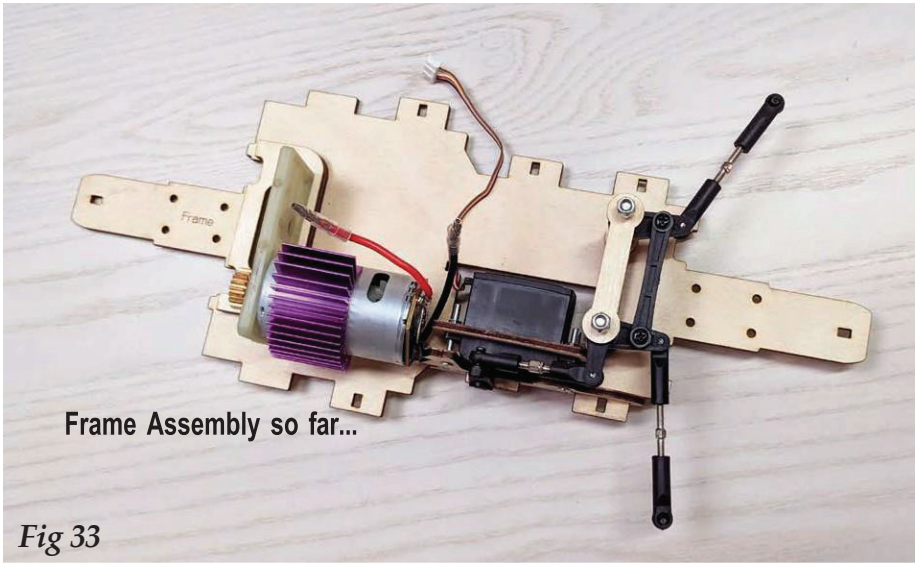
Fig 31

Fig 32

6 Slip the third ***B3*** over the top of the steering assembly, then lightly attach the nuts of the ***4 x 60 mm screws*** Fig (33). You'll remove them later, but this will keep things in place while you work on other areas.

7 Use two ***2.5 X 10 mm Screws*** to connect the ***Steering Rods*** to the underside of the steering assembly (Fig 32).

Take a pit stop and check your work. Does the servo horn turn and cause the steering assembly to pivot? Does the suspension move and bounce appropriately? Do the front two wheels turn freely?



Frame Assembly so far...

Fig 33

PUTTING IT TOGETHER

It's finally happening

1 Time to put the big parts together. Slide your ***Front Suspension Assembly*** onto the front of the frame. It'll be a tight fit and may require some wiggling to get it in place. Be careful and take your time to avoid breaking anything (Fig 34).

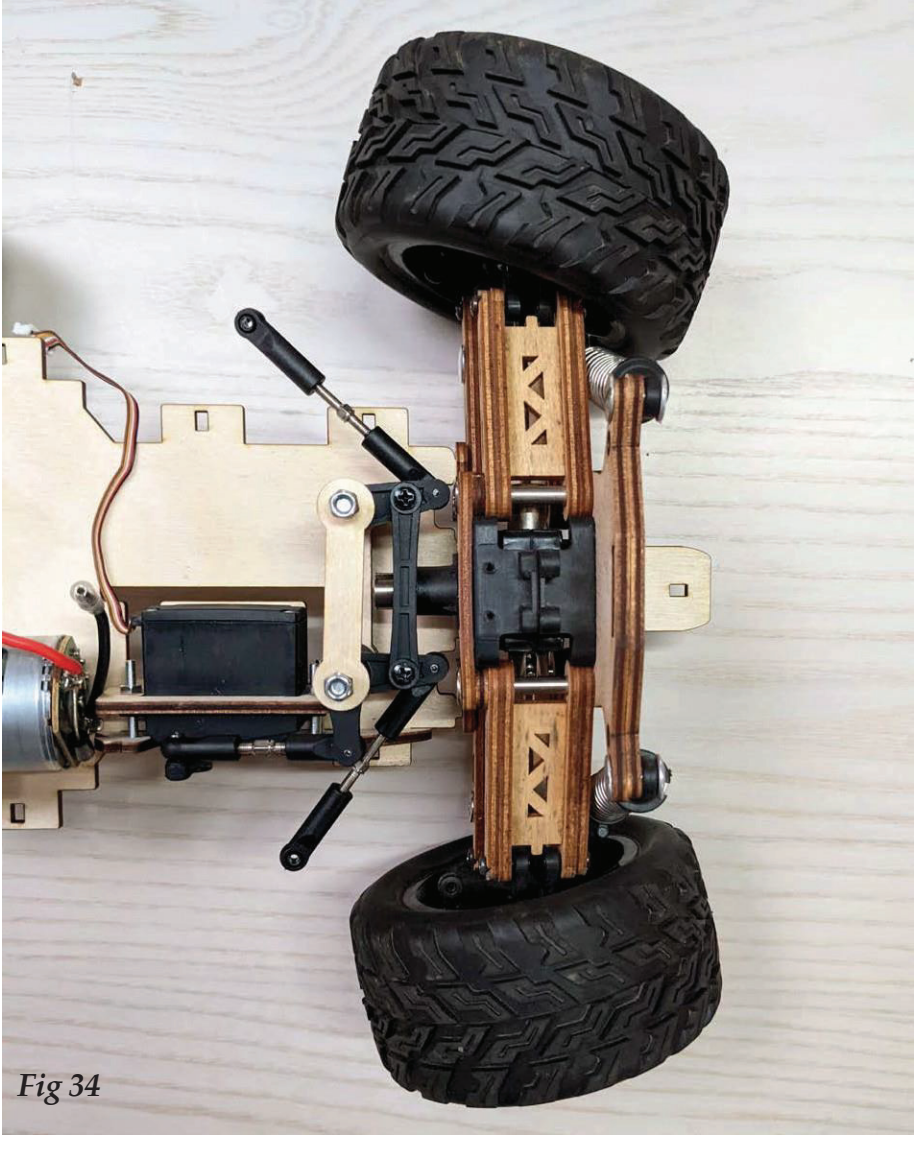


Fig 34

Fig 35

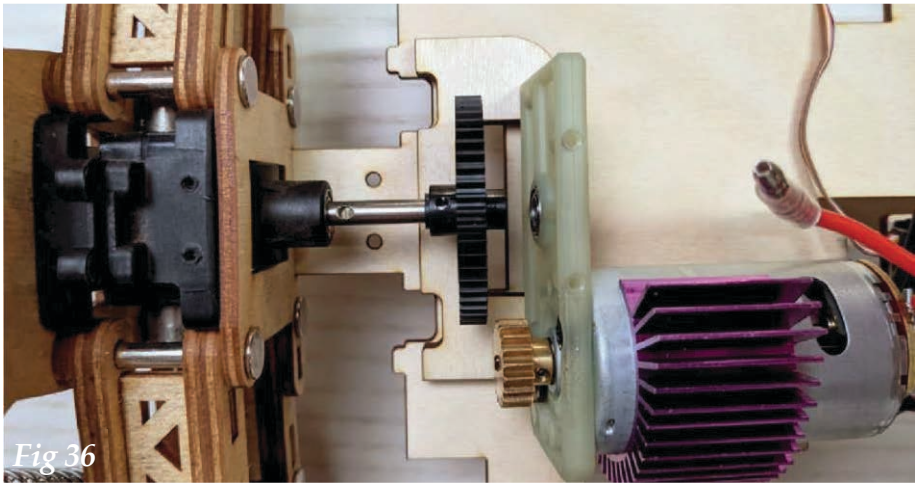


Fig 36

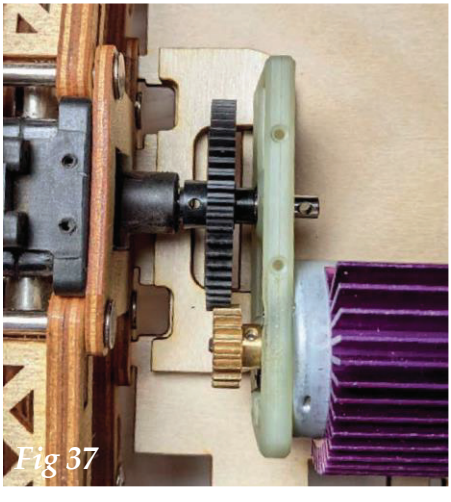


Fig 37

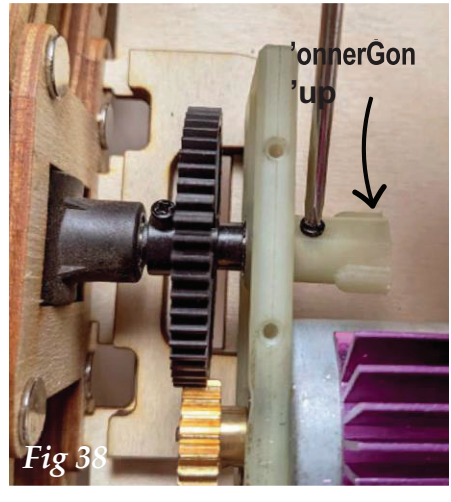


Fig 38


Fig 39

2

Use ***2.5 x 10 mm Screws*** to connect the ***Steering Rods*** to the top mounts of the ***Front Steering Cups*** (Fig 35).

3

Now, prepare to slide the ***Rear Suspension Assembly*** onto the back of the frame like you did with the front (Fig 37).

4

As you're sliding it on, you'll need to pass the main axle of the ***Rear Gear Box*** through a few components. Find the ***Great Gear*** and frame it up against the ***Motor Mounting Plate*** (Fig 37). Pass the axle through both the gear and mounting plate until it's poking out about half an inch (Fig 38). The hole for fixing the gear to the axle should be on the side of the gear box.

5

Place the ***Connection Cup*** and ***Drive Shaft*** onto the end of the axle (Fig 38). The other end of the drive shaft should slot into the ***Front Gear Box*** (Fig 39, 40). Once those are in place, you can finish pushing the rear suspension assembly onto the frame, locking the ***Drive Shaft*** in place.

6

There are two ***Half Screws*** that will lock the gear and connection cup into the axle. Hold the cup and gear in place, then rotate the tires until the holes line up. Drop in the half screws, then tighten (Fig 38).


Fig 40

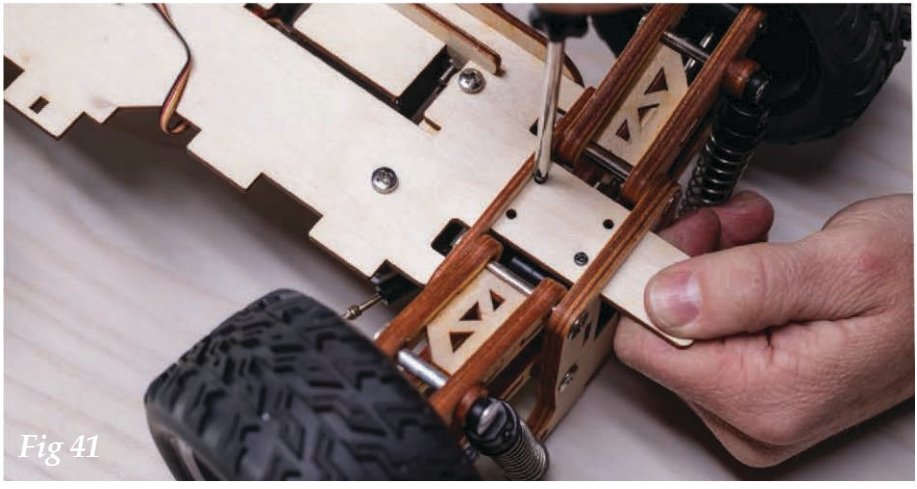


Fig 41

7. Once both suspension assemblies are fully in place, flip the car over and use eight ***2.6 x 10 mm Screws*** to secure the frame to the gear boxes (Fig 41).

8. Next, pop out ***B5***, the upper frame of the car. Install the switch connected to the ***Receive*** into the middle slot of B5 using the included screws (Fig 42). Pass the velcro strap through the two vertical slots to mount the battery during operation.

9. Stack two ***B6*** wood spacers, between B5 and the motor mount plate (Fig 43. Using glue, stick both B6 pieces into place on the underside of B5, then flip B5 over and use two ***2.6 X 14 mm Screws*** to attach it to the mounting plate (Fig 44).

10. Use ***2.6 X 10 mm Screws*** to finish attaching B5 to both ***Gear Boxes*** (Fig 45). Finally, replace and tighten the nuts over the ***Steering Assembly*** (Fig 46). *Overtightening might prevent steering from functioning.*

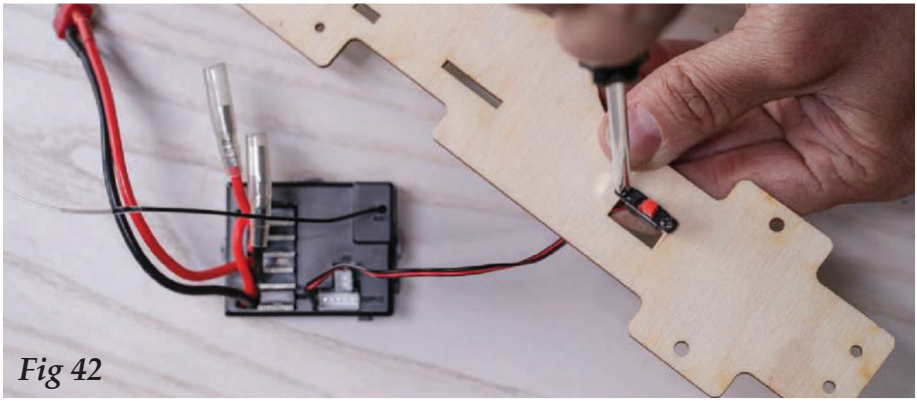


Fig 42

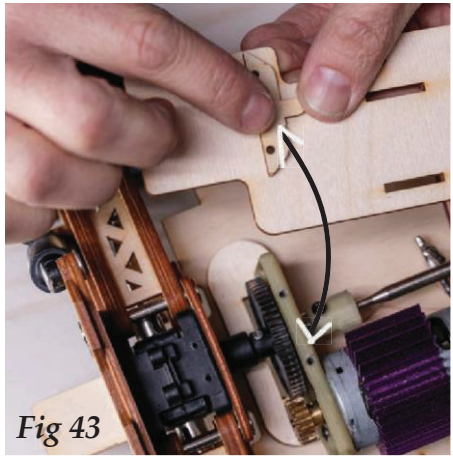


Fig 43

Fig 44

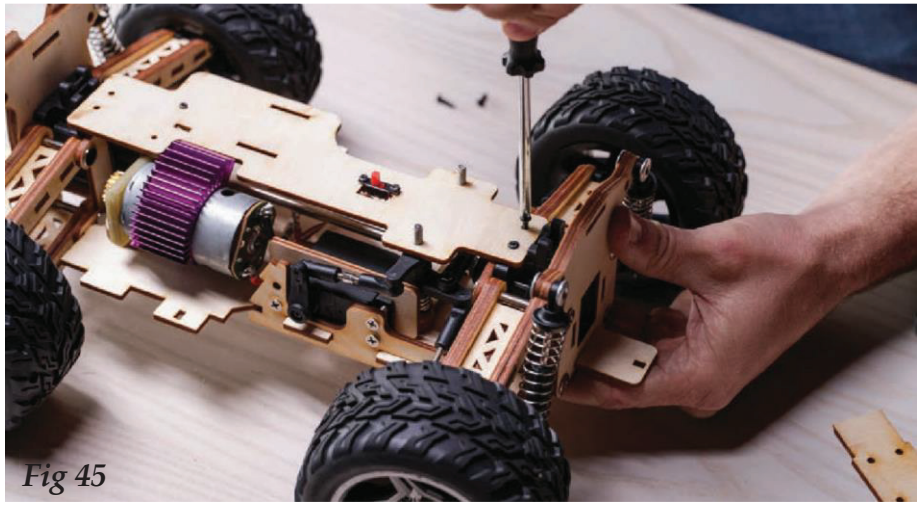


Fig 45

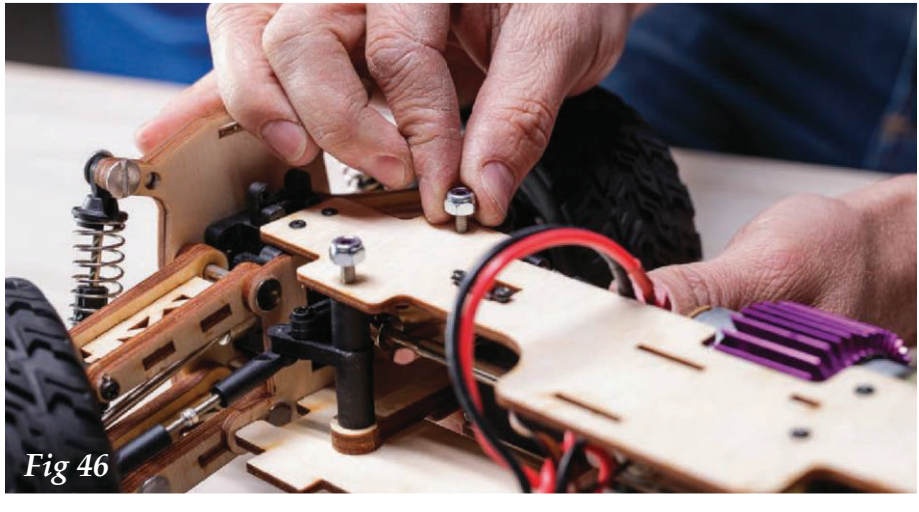


Fig 46

HOOKING IT UP

Juicing up your RC car

1. It's time to hook up the electronics. Use your fingers to plug the cable from the ***Steering Servo*** into the ***Receiver*** (Fig 47).
2. Position the receiver opposite the motor on the frame. Once lined up, lightly sand and clean that part of the frame for best adhesion, then stick the receiver in place using the mounting tape (Fig 48, 49).
3. Next, use two ***Power Connectors*** to connect the motor to the receiver—red to red, and black to black

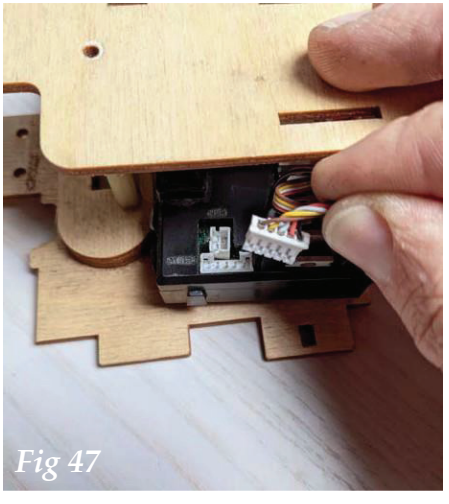


Fig 47

Fig 48

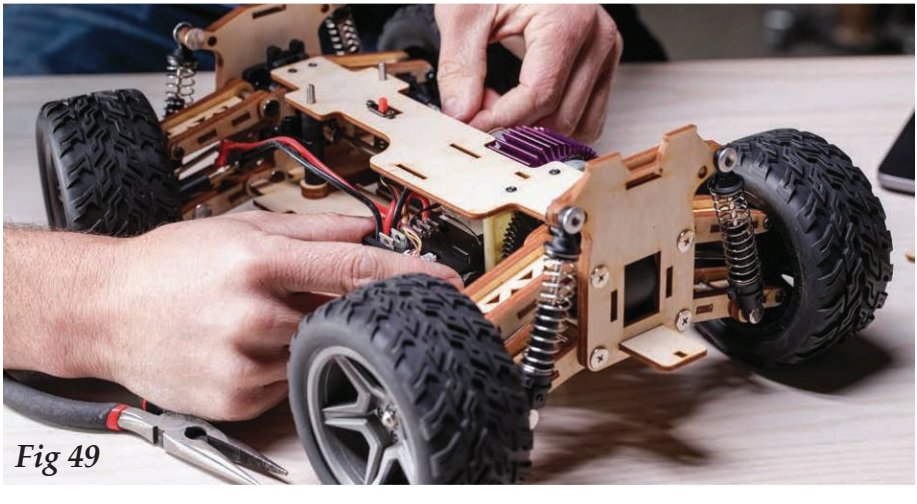


Fig 49

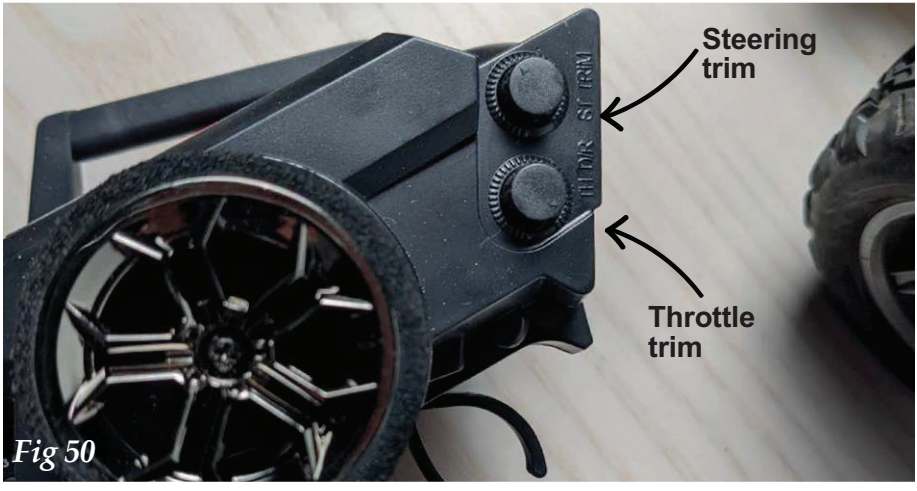


Fig 50


Fig 51

Now that everything is connected, you can take it for a test drive and tune it. Put batteries in the remote and charge and connect the lithium battery to the car.

4. First, adjust individual tires until they are aligned. Use pliers to turn the ***Steering Rods*** until the tires are pointing in the same direction (Fig 51).

5. Once you power-up the remote and the car, it will automatically "straighten" the wheel. This is the default position for the wheels.

6. On the remote control, turn the steering trim to adjust the "home" position of the wheels until they point straight ahead (Fig 50).

   Take it for a spin and make adjustments as necessary. The throttle trim controls acceleration. If it's too fast, take it in a bit, and if it's slow, then let it out.

THE TRIM

Giving your buggy a body

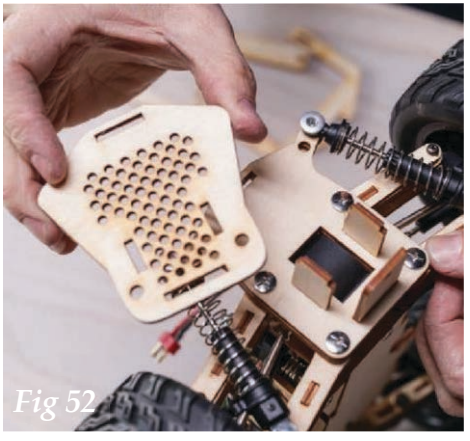


Fig 52

Fig 53

1

Insert two ***C1*** tabs into the slots in the front of the car (Fig 52). Mount the ***Grill***, then lock it in place with the ***Clip*** (Fig 53).

2

Slide ***C5*** through ***C3*** and both ***C4*** pieces, then continue through the suspension assembly and grill. This will take some wiggling, but once it's through, all the pieces will be locked and held steady (Fig 54).

3

Then lock it in place with one Clip.

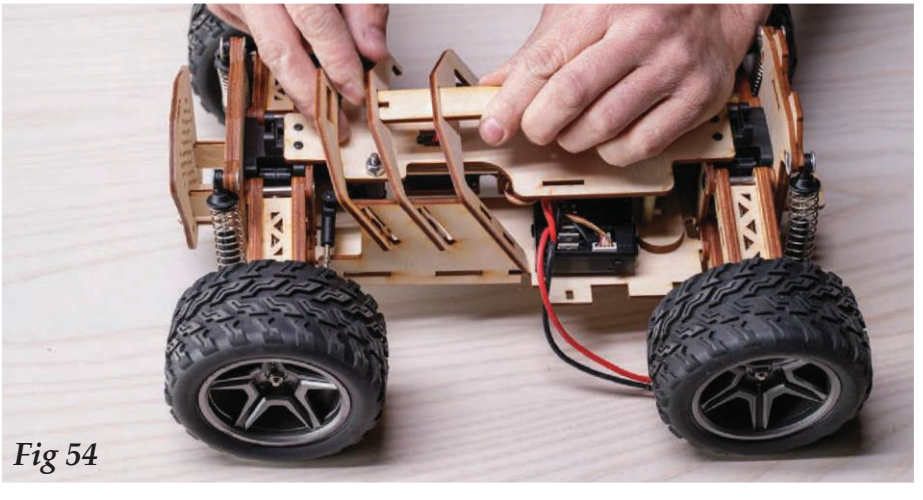


Fig 54

4

Punch out the ***Roof*** (marked with the artwork) and give it a gentle bend back and forth to make it flexible (Fig 55).

5

Push the roof's tab through the ***Rear Suspension Assembly*** slot until edges are flush (Fig 56).

6

Fold in the roof's sides and slot them onto the ***Frame*** using ***Clips*** to secure both sides (Fig 57).

Fig 55

Fig 56

Fig 57

Fig 58

Fig 59

7 Just like the front, mount the ***Rear Grill*** using ***C1*** tabs and a ***Clip*** on the bottom to hold it in place (Fig 58, 59).

8 Slot the ***Spoiler*** on top of the rear grill and tabs of the rear suspension assembly (Fig 60).

Use two ***Clips*** to lock it in place. (Fig 61)

Fig 60


Fig 61

Fig 62

9 Finally, to connect the ***Battery***, locate the two slots in B5. Feed the Velcro Battery Strap through these slots and use it to tie down the battery when in use (Fig 62). Connect the battery to the Receiver, and power it up for a celebratory joyride.

Congrats, you've finished your car! Just don't crash it on your first spin around the block. Cut your teeth in an empty parking lot or field where there are minimal obstacles. It can take a roll and tumble, but a headfirst collision could break your control arms.

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