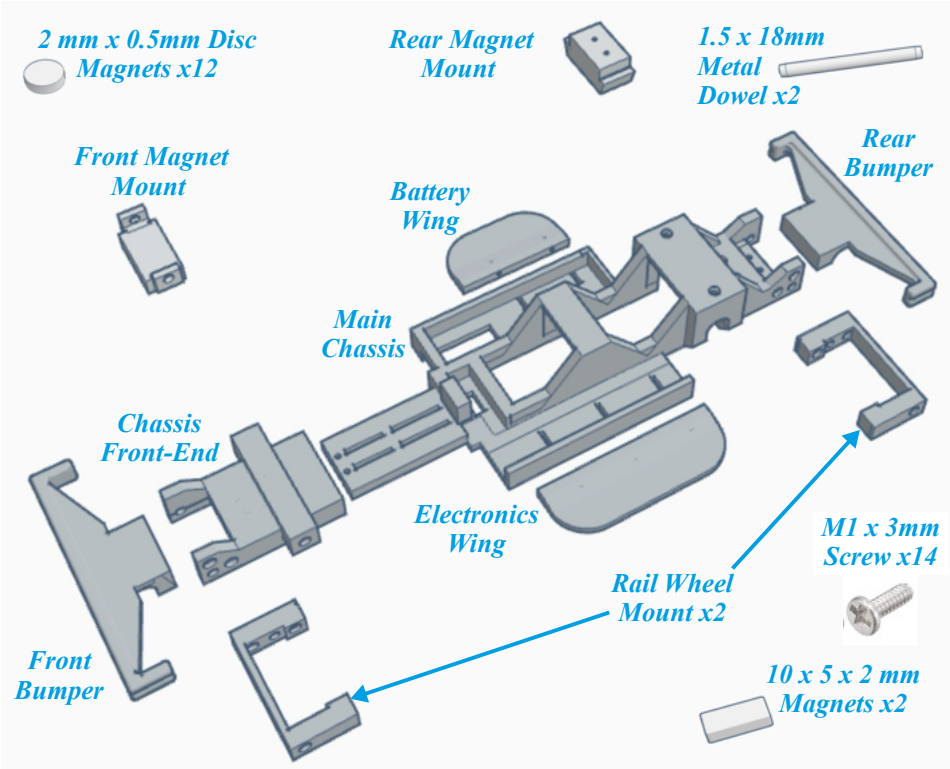
InvisaTrax® Road & Rail Track Inspection Vehicle

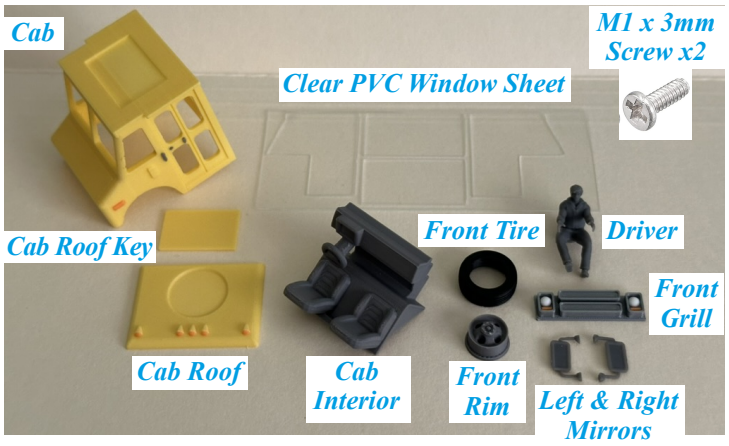
Thank you for purchasing the *InvisaTrax® Road and Rail Track Inspection Vehicle*. The following instructions will walk you through the assembly of the Track Inspection Vehicle kit. We recommend reading through the instructions and familiarizing yourself with the components before beginning the build process.

Kit Components

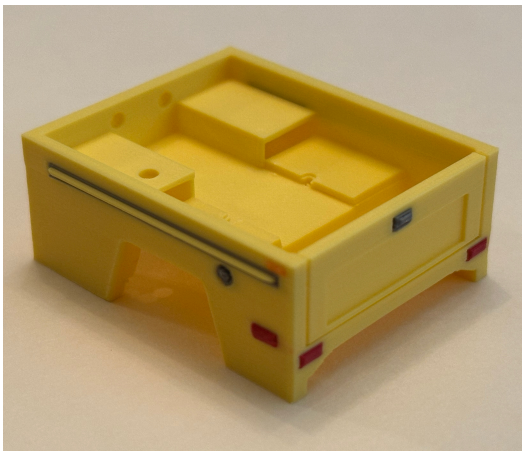
Chassis



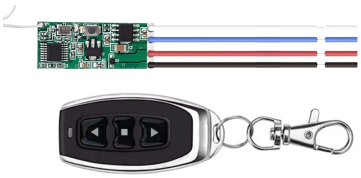
Cab



Bed



Electronics/Motor



433 Mhz RF Wireless Transmitter and Micro Motor Control Module

3v DC 15 RPM N20 Dual Shaft Motor

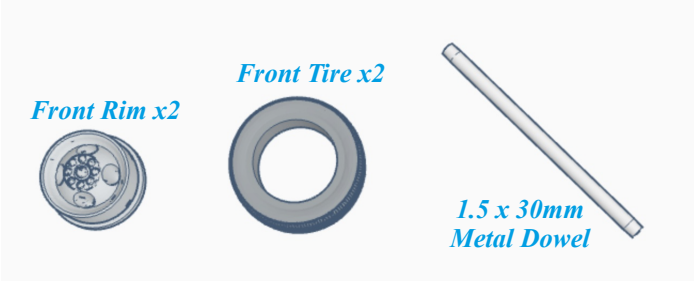
3.7v 90 mAh LiPo Battery

SPDT Micro Slide Switch

1.25mm 2-Pin Female JST Conncector, Pre-wired

28 Gauge Solid Copper Wire Twisted Kynar Wire

Front Wheel

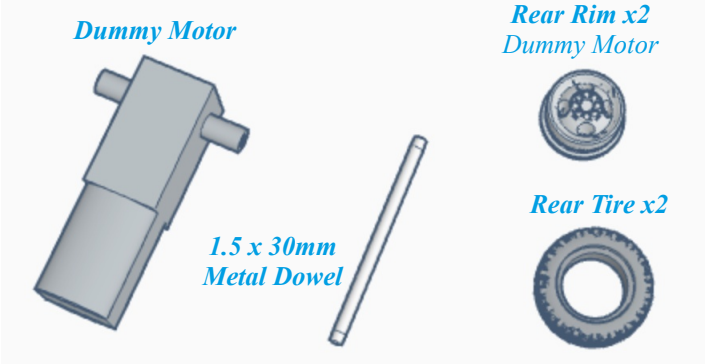


***Note**: the front tires are hard plastic and the rims have a dimple in the center of the hub.*

Rear Wheel - N20 Motor

Rail Wheel

Rear Wheel & Dummy Motor



Tools & Miscellaneous Supplies Needed

Recommended Tools

- Philips Head Screw Driver (size PH0)
- Needle Nose Pliers *(optional)*
- Soldering Iron
- Desoldering Tool (wick or sucker)
- Solder: 60/40 Rosin Core (0.032" diameter)
- Wire Cutters
- Wire Strippers
- Drill Bit *(optional)*: 0.9mm *(to enlarge mounting holes as needed; self-tapping holes)*
- Drill Bit *(optional)*: 1.1mm *(to enlarge mounting holes as needed; pass-thru holes)*
- Drill Bit *(optional)*: 0.8mm *(to clean desolder areas in circuitbard if need be)*

Other Items

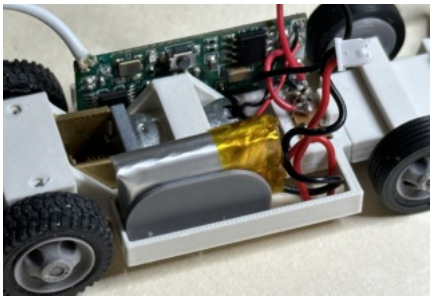
- Superglue

- Canopy Glue *(optional)*

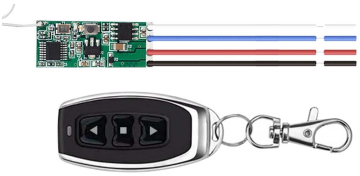
- Liquid Electrical Tape *(optional: to insulate wiring)*

- 3.7v LiPo Battery Charger
  (Amazon Affliate Link: https://amzn.to/47JEQjp)

Electronics/Motor Assembly



Electronics Components



433 Mhz RF Wireless Transmitter and Micro Motor Control Module

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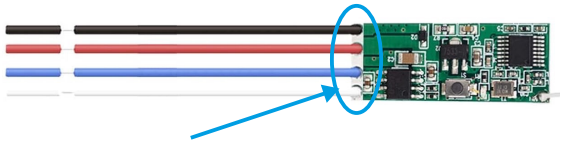
28 Gauge Solid Copper Wire Twisted Kynar Wire

Replace Wires on Motor Control Module

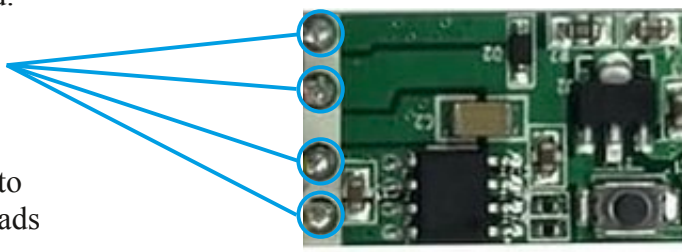
The wires that come pre-soldered to the Motor Control Module are too thick to fit in the chassis. Therefore, they need to be replaced using the 28 gauge Kynar wire.



Remove the wires by desoldering them from the circuit board.

Carefully remove the wires from the circuit board. Using a soldering iron, heat the attached wires from the top side and gently pull loose once the solder has melted.

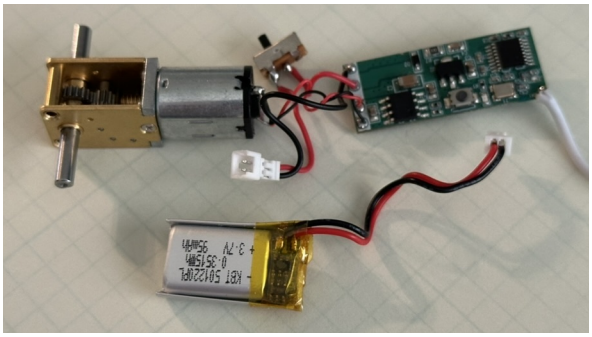
Use a desoldering wick or solder sucker to remove remaining solder from the circuit board holes.



If the holes are not fully cleared, used a 0.8mm drill bit to ream out the holes. Be careful to not loosen the solder pads on the circuits.

Assemble the Electronics

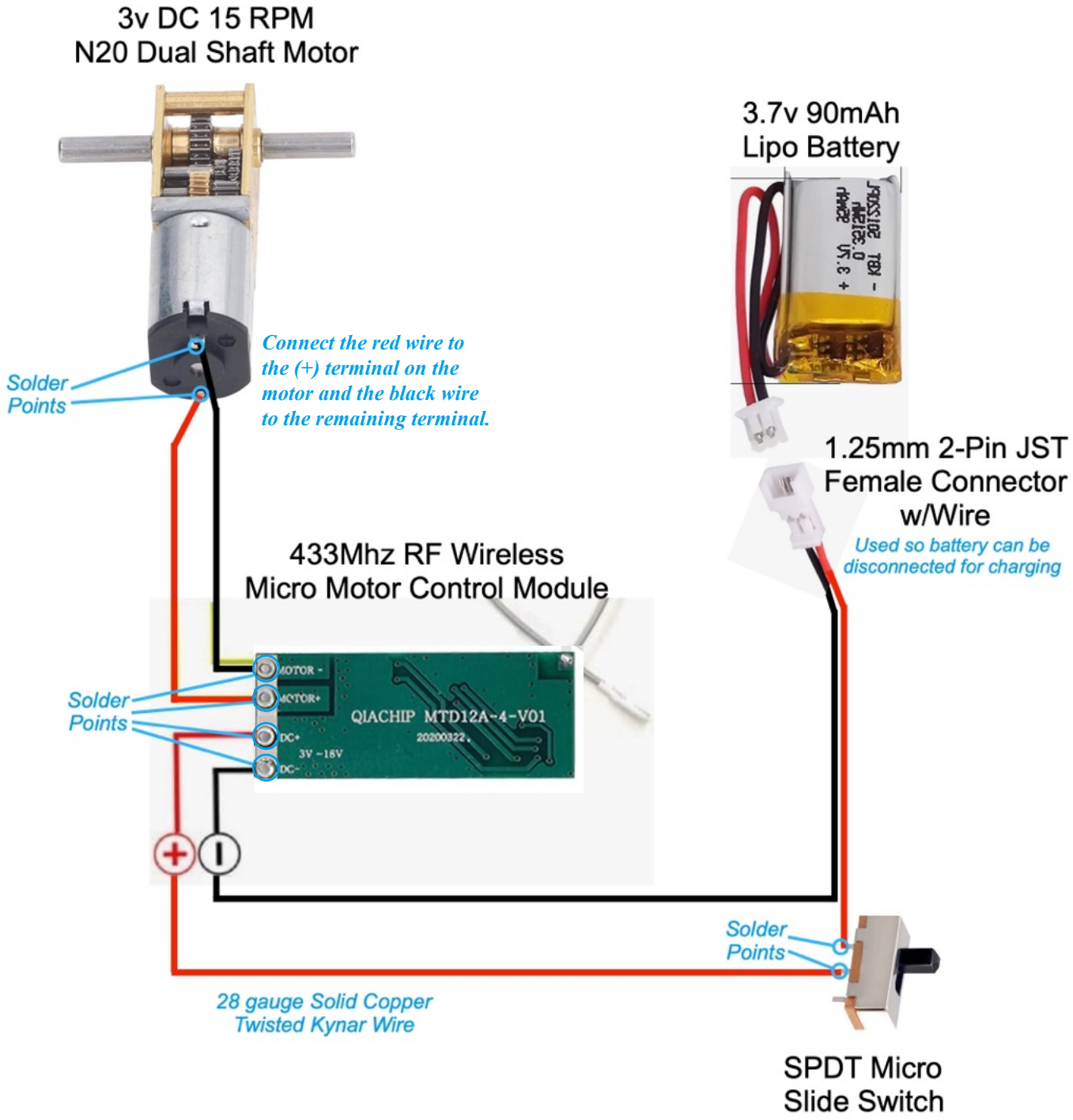
Use the following wiring diagram to solder the motor, motor control module, slide switch, and battery together.



Keep the connecting wires as short as possible to allow for easy placement in the chassis.

Keep the length on the battery connector so that it can be easily disconnected and the battery removed for charging.

Wiring Diagram



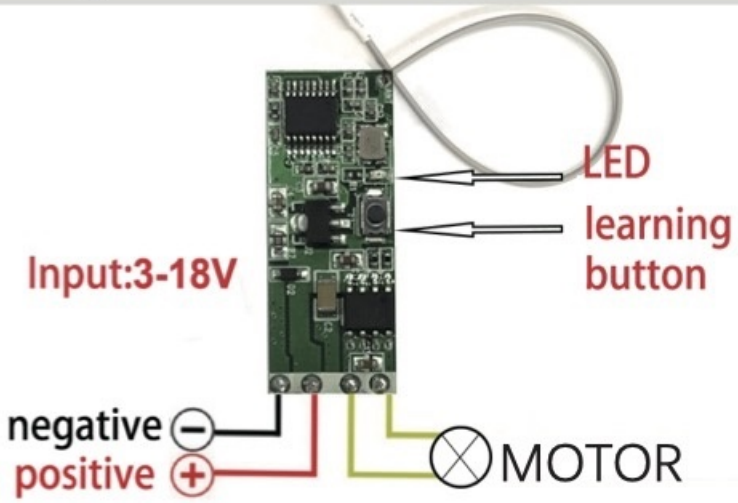
Caution: *Electro Static Discharge or ESD is a static electric charge your body can build up. For example: it can occur when you walk across a carpet and then touch metal, getting shocked. Before handling the Motor Driver circuit, you should touch something that is grounded, or something metal, to discharge any static electricity you may be storing.*

Make sure all solder joints are good and that there are no shorts in the wires. If desired, use liquid electrical tape to insulate wire connections.

Note: the Micro Motor Control Module will need to be paired and programmed before testing and use. Follow the included manufacturers instuctions for pairing and programming. The Latching Mode is recommended for its ease of operation.

Micro Motor Control Module

Wiring diagram



Introduction to Control Modes

Momentary Mode Pairing Instructions

Momentary mode: press and hold the A button of the remote control, the motor rotates forward, release to stop, press and hold the B button of the remote control, the motor reverses, release to stop

Setting: press the learning button once, the indicator light is always on, enter the pairing mode, press the A button of the remote control, the indicator light flashes and then keep on, then press the B button of the remote control, the indicator light flashes and then goes out, and exits the pairing mode

Toggle Mode Pairing Instructions

Toggle mode: press the A button of the remote control, the motor rotates forward, press the A button again, the motor stops, press the B button of the remote control, the motor reverses, press the B button again, the motor stops

Setting method: press the learning button twice, the indicator light is always on, enter the pairing mode, press the A button of the remote control, the indicator light flashes and then light up, then press the B button of the

remote control, the indicator light flashes and then goes out, exit the pairing model

Latching Mode Pairing Instructions

Latching mode: press the A button of the remote control, the motor rotates forward, press the B button of the remote control, the motor reverses, press the C button of the remote control, the motor stops

Setting: press the learning button three times, the indicator light is always on, enter the pairing mode, press the A button of the remote, the indicator light flashes and then lights up, then press the B button of the remote, the indicator light flashes and then lights up, and finally press the C button of the remote, the indicator light turns off after flashing, and exits the pairing mode

Clean code

Press the learning button 8 times, the indicator light will turn off after flashing, and the module will clear the paired remote key value

Power save mode

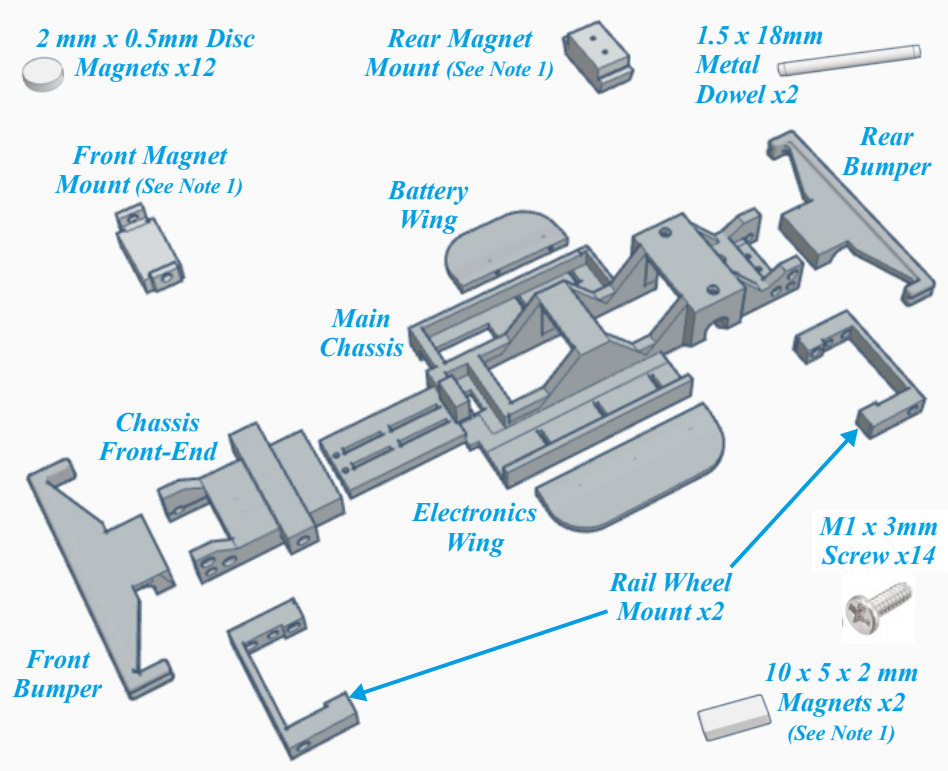
Description: the quiescent current is reduced from 6mA to 1mA, but it needs to press and hold the remote control for a long time to wake up the module

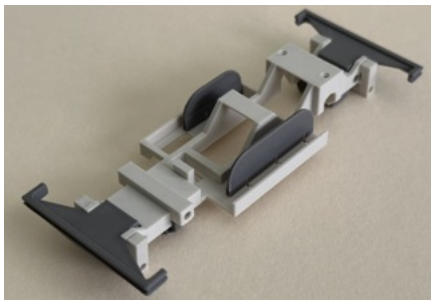
Setting: press the learning button 4 times, the indicator light flashes and then goes out, the module enters the power saving mode; press the learning button 5 times, the indicator light flashes and then goes out, the module exits the power saving mode

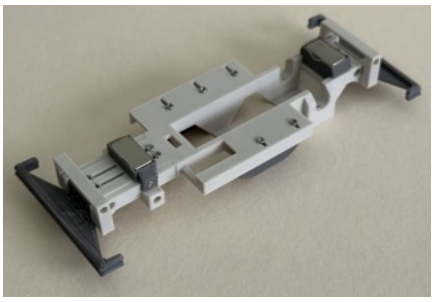
Working voltage	DC 3V~18V
Maximum load	2A
Static current	≤ 6mA
Working frequency	433.92MHz
Remote control code	EV1527
Working mode	Momentary,Toggle,Latching,Power save
Control method	Remote, Panel switch
Number of memories	12 sets of remote controls
Size	32.2 mm x 12.8mm x 3mm (length × width × high) Mini size!

Chassis Assembly

Chassis Components





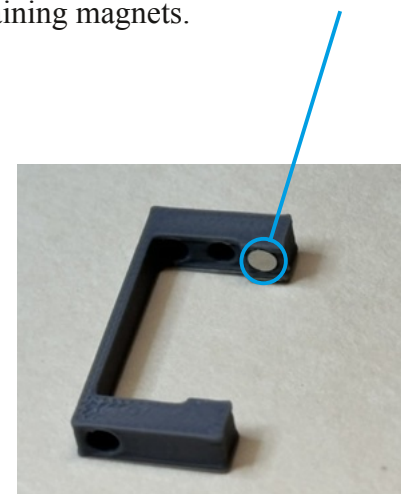


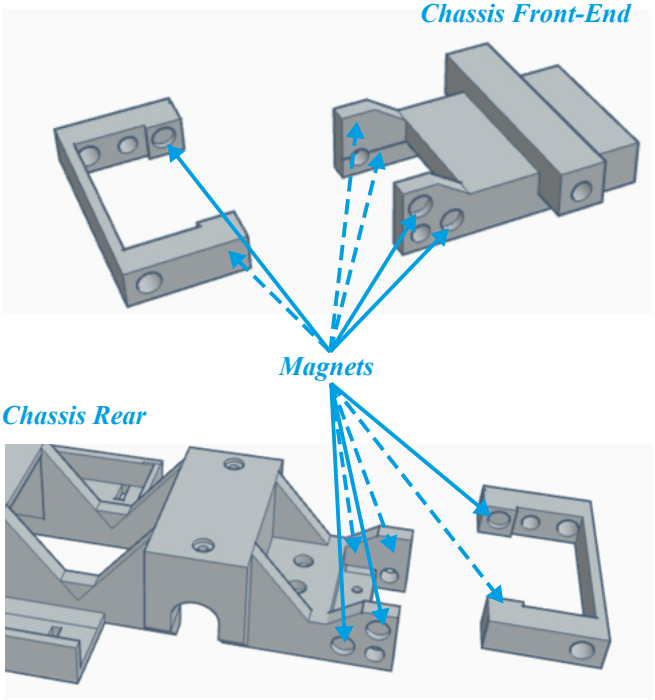
Note 1- *See optional Chassis Magnets for Motorized Road Operation and InvisaTrax® Transport System compatibilty on page 13.*

Attach Magnets to Chassis Front-End, Chassis, and Rail Wheel Mounts

Locate the twelve (12) 2 mmx 0.5mm disc magnets. Using superglue, attach them in the recessed areas on both sides of each piece as shown.

We recommend starting with one (1) magnet in one of the rail wheel mounts to use as a polarity guide for the remaining magnets.

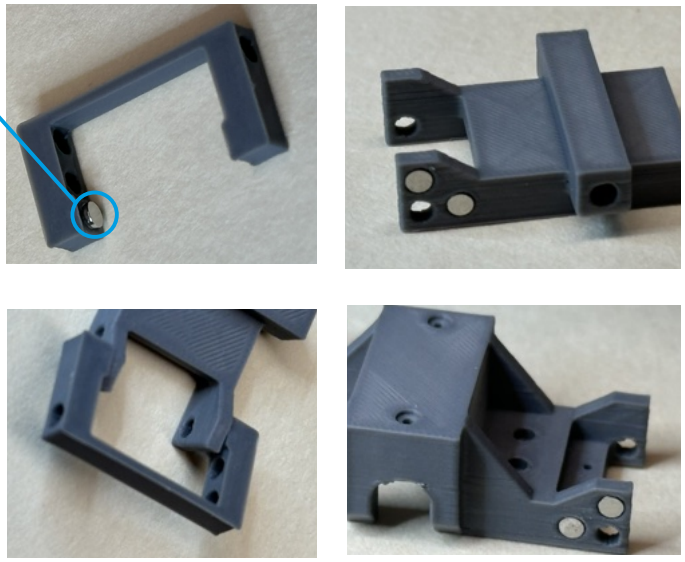




Once the glue for the first magnet has dried, place a magnet on top of it; thus auto-aligning the polarity.

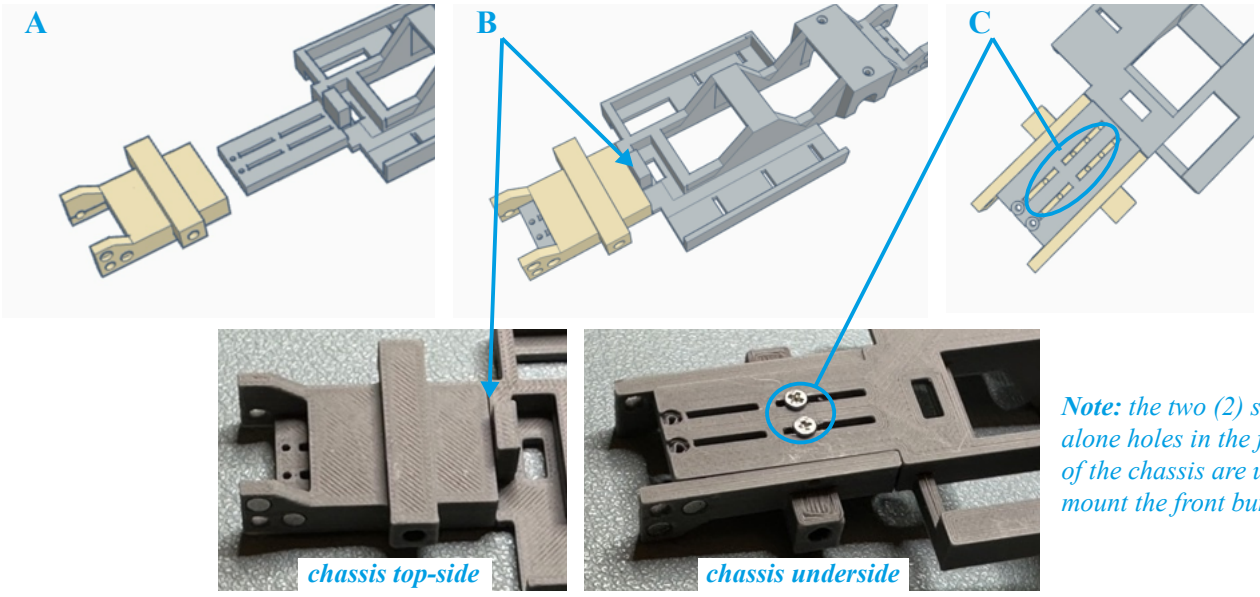
Put a drop of glue in the recessed area of the receiving chassis piece. Place the rail wheel mount with the extra magnet over the recessed area pushing the additional magnet in place. Gently slide the rail wheel mount off the magnet making sure the magnet does not flip (thus chaning polarity) and remains in the recessed. Verify the polarity is corrent after the glue has dried.

Once all the magnets are glued to the chasses pieces, use one of the magnets on the chassis as the guide for gluing the remaining magnets to rail wheel mounts.



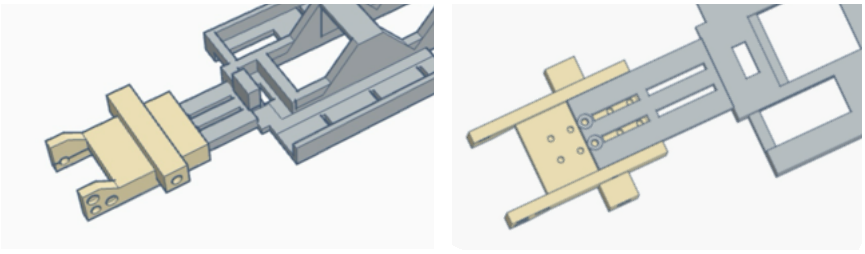
Attach Chassis Front-End to Main Chassis

Slide the chassis front-end over the front of the main chassis (**A**). Place it all the way towards the back touching the raised area on the chassis (**B**). This position supports the wheelbase of the Track Inspection Cab. Turn the two pieces over and attach the front-end piece to the main chassis with two (2) M1-3mm screws. Any of the screw holes in the front-end can be used (**C**).

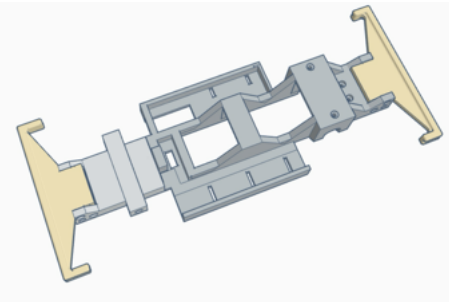


Note: *the two (2) stand-alone holes in the front of the chassis are used to mount the front bumper.*

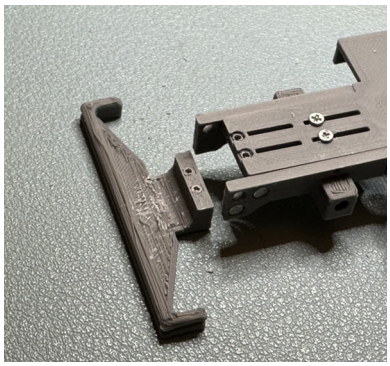
When mounting other bodies the chassis, adjust the postion of the front-end to match the wheelbase of the body. Turn the two pieces over and attach the front-end piece to the main chassis with two (2) M1-3mm screws.

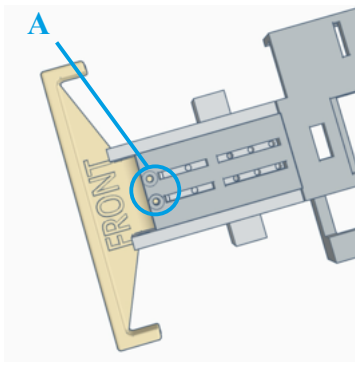


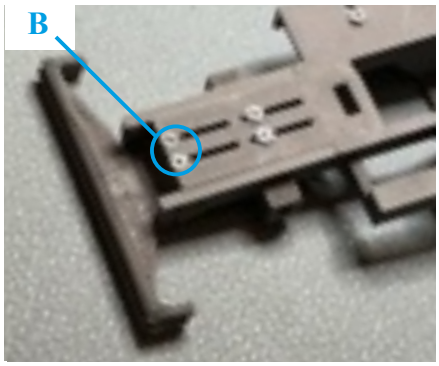
Attach Bumpers to the Chassis



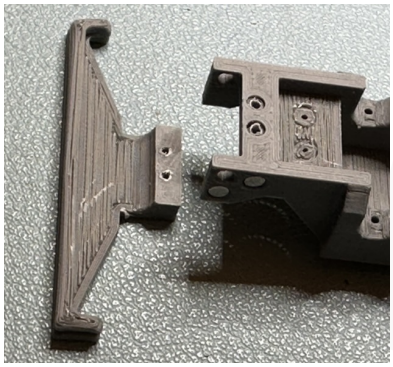
Align the front bumper with the corresponding mounting holes in the chassis (**A**). Turn the two pieces over, use two (2) M1-3mm screws to attach the front bumper to the chassis (**B**).

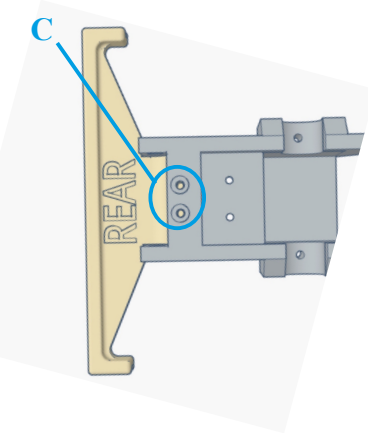


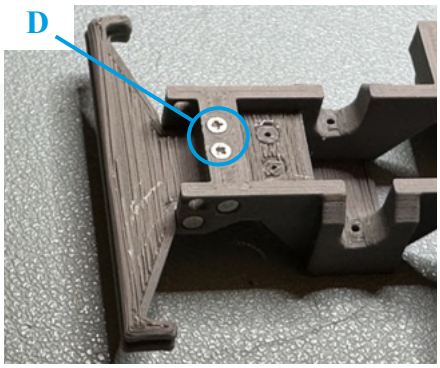




Align the rear bumper with the corresponding mounting holes in the chassis (**C**). Turn the two pieces over, use two (2) M1-3mm screws to attach the rear bumper to the chassis (**D**).

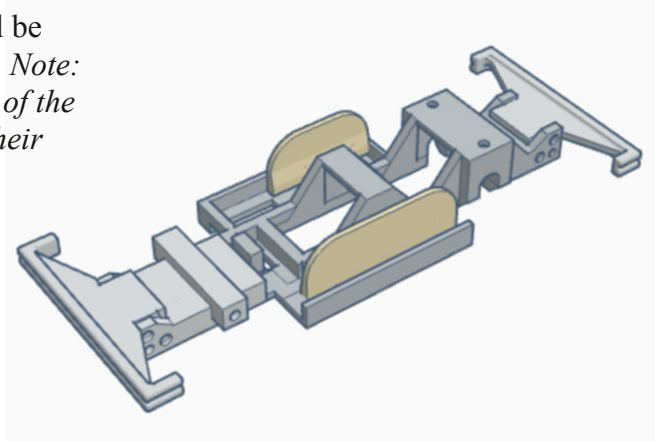


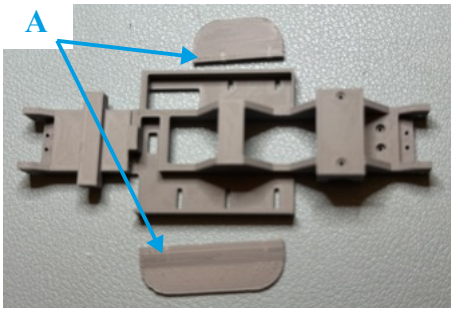




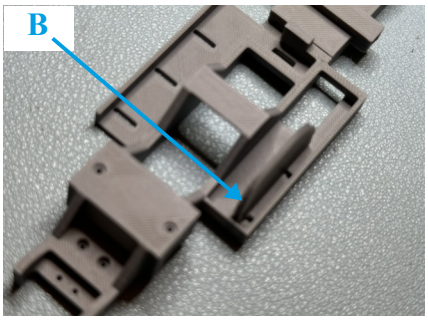
Attach Wings to Chassis

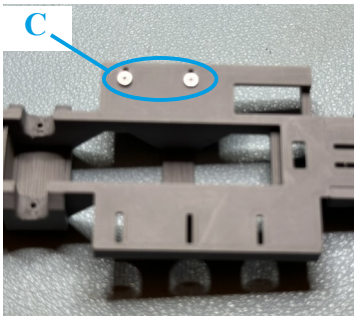
Locate the battery and the electronics wings. The wings will be attached to the chasses using two (2) M1-3mm screws each. *Note: the angled side of the wings (A) should be facing the center of the chassis. The mounting holes in the wings are aligned with their respective chassis holes to support this position.*

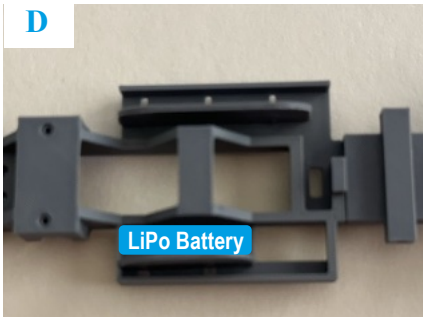




Align the battery wing with the mounting holes in the chassis (B). Turn the two pieces over, use two (2) M1-3mm screws to attach the wing to the chassis (C). Do **NOT** fully tighten screws at this point, you should be able to slide the battery wing back and forth by the screws in the channel.





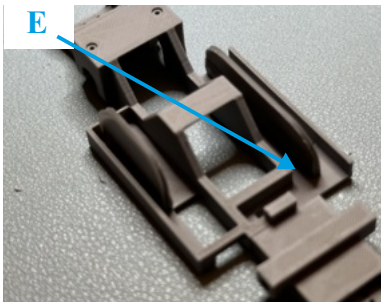


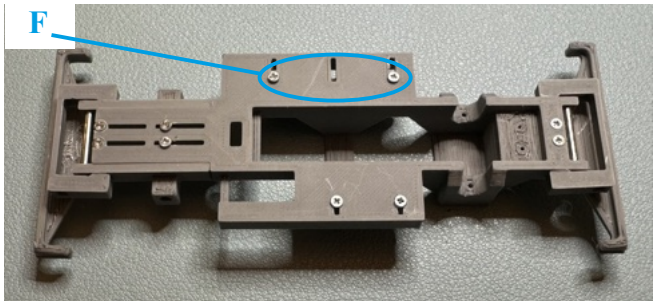
Due to the different sizes of LiPo batteries on the market, the battery wing has been designed so it can be adjusted to fit varying battery thicknesses.

Insert the LiPo battery in the space between the center of the chassis frame and the wing. Position the battery wing so that it is touching the battery and holding it in place. Tighten the screws on the wing. Remove the battery to continue assembling the chassis.

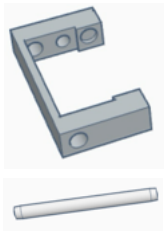
Align the electronics wing with the mounting holes in the chassis (E). Turn the two pieces over, use two (2) M1-3mm screws to attach the wing to the chassis (F). Position the wing so that it is closest to the center of the chassis and tighten the screws.

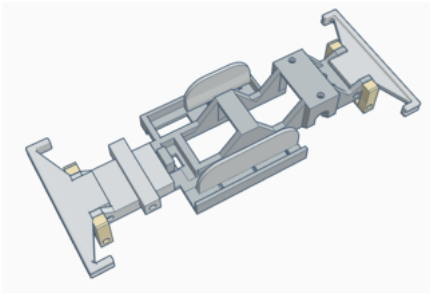
Note: the electronics wing is also adjustable to allow for the installation of other electronics and/or a decoder. Adjust the position of the wing to support the installed product.





Attach Rail Wheel Mounts to Chassis



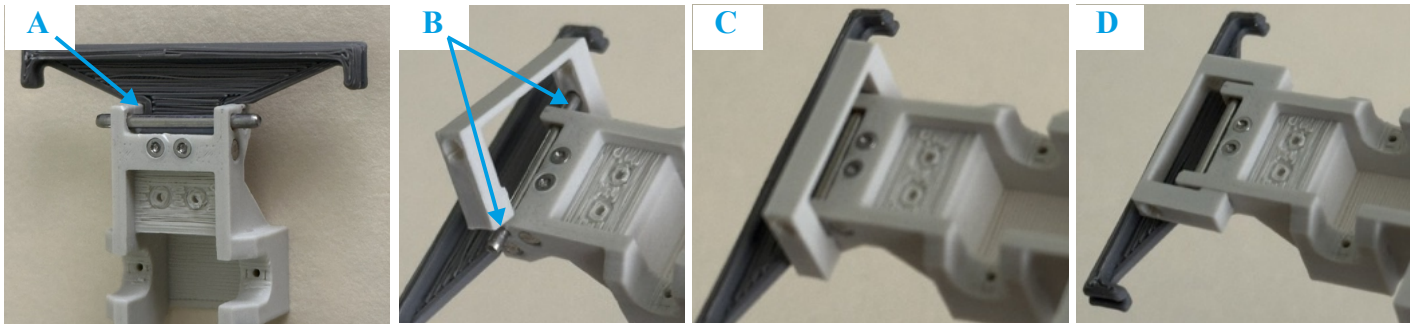


The rail wheel mounts get attached to the chassis using the 1.5 x 18mm metal dowels.

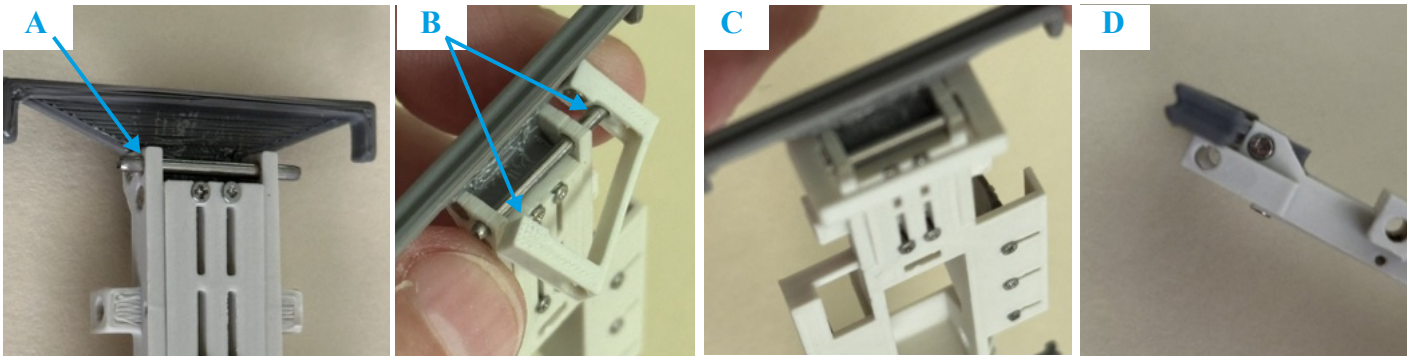
Insert a dowel into the axle hole in the rear of the chassis (**A**).

Clip the rail wheel mount onto the dowel by placing one end in the center recessed hole of the wheel mount, slightly bend the wheel mount so it can slip over the other end of the dowel, move it so that the other end of the dowel is seated inside the center recessed area (**B**).

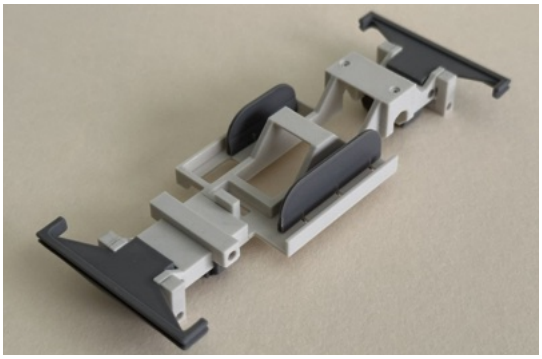
The rail wheel mount will rotate on the metal dowel and be held in place in the down (**C**) or up (**D**) positions by the magnets preveiously installed. ***Warning**: do **NOT** use glue on any of these pieces.*



Insert a dowel in the axle hole in the front-end chassis piece (**E**) and repeat the procedure described above to install the front rail wheel mount.



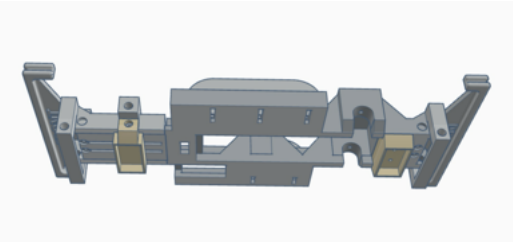
The Road & Rail Track Inspection core chassis is now complete.



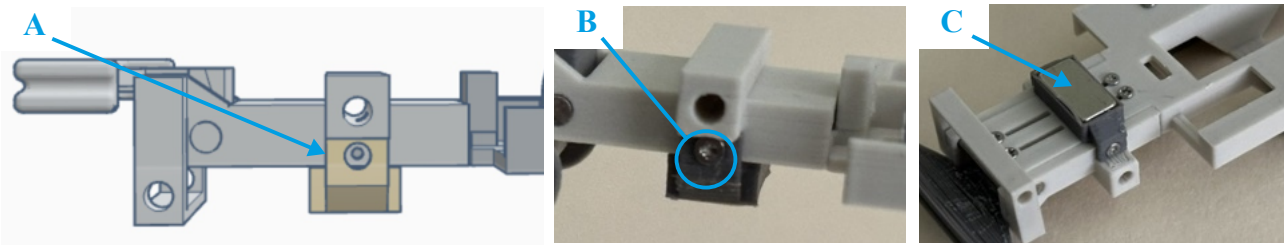
***Note:** if running the chassis on the **InvisaTrax® Transport System** or the metal guide tracking configuration, complete the next section. Otherwise skip to the **Rail Wheel Assembly** instructions on **page 14**.*

Optional Chassis Magnets - Motorized Road Operation & InvisaTrax® Transport System

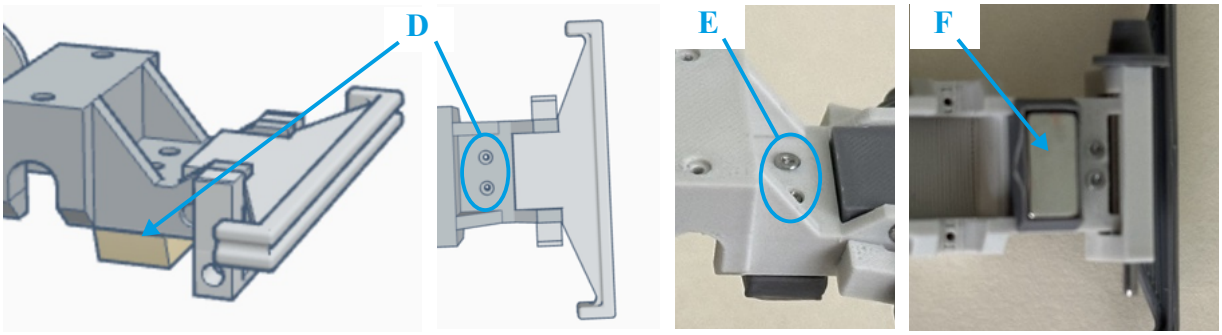
Locate the front and rear magnet mounts. The mounts will be attached to the chasses using two (2) M1-3mm screws each.



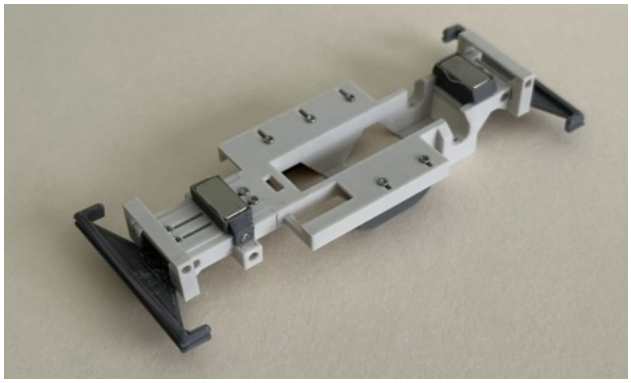
Align the mounting holes on front magent mount to the corresponding holes in the sides of the chassis that are located directly beneath the front wheel axle hole (**A**). Use one (1) M1 - 3mm screw on each side of the chassis to attach front magnet mount (**B**). Turn the assembly over and glue the 10 x 5 x 2mm magnet in place (**C**).



Place the rear magnet mount recessed area on the chassis, aligning the mounting holes in the mount with the mounting holes in the chassis (**D**). Use two (2) M1 - 3mm screws to attach the mount to the chassis (**E**). Turn the assembly over and glue the 10 x 5 x 2mm magnet in place (**F**).

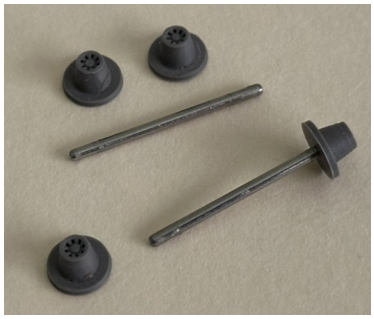


The Road & Rail Track Inspection chassis core is now complete and ready to be used on the ***InvisaTrax® Transport System*** *or as a metal guide following vehicle. Continue to the next section,* ***Rail Wheel Assembly****.*



Rail Wheel Assembly

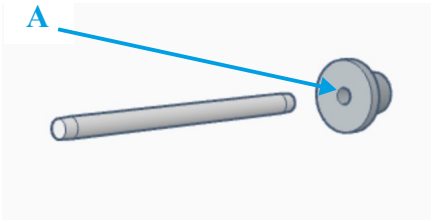
Rail Wheel Components

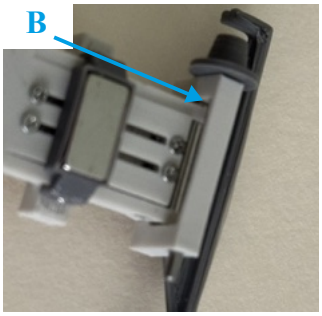


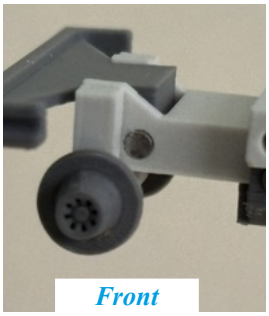
Insert one end of a 1.5 x 25mm metal dowel into one (1) of a rail wheels (**A**) and superglue in place. Insert the metal dowel/axle in the mounting hole in the front rail wheel mount attached to the chassis (**B**). Press a second rail wheel onto the other end of the axle.

Important Information: *rail wheels that are pushed fully onto the axle could be to narrow to function properly, especially when entering turnouts. Before permantly attaching the second rail wheel, use a Standards Gauge or manually run the chassis on your track and through turnouts too determine the correct spacing of the rail wheels. Gently pull the loose/unglued wheel until the width of the rail wheels match the Standards Gauage and/or your track spacing. Glue the wheel in place.*

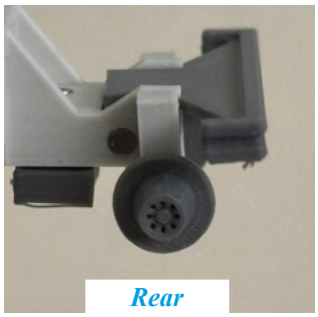
Note: *The mounting hole in the rail wheel is 2mm in depth, allowing for the width to be adjusted without affecting stablity.*





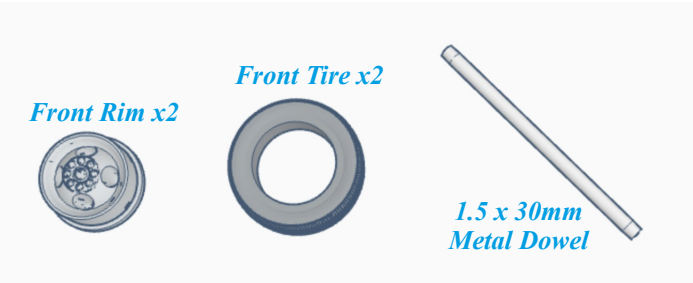


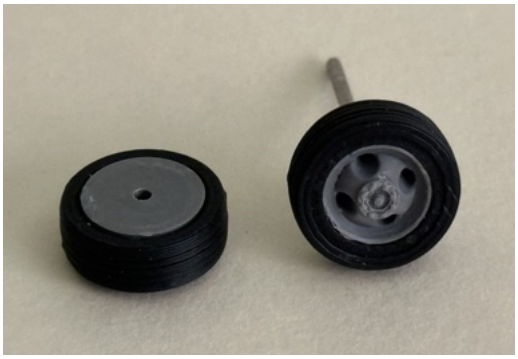
Repeat the process for the rear rail wheels and rear rail wheel mount.



Front Wheel Assembly

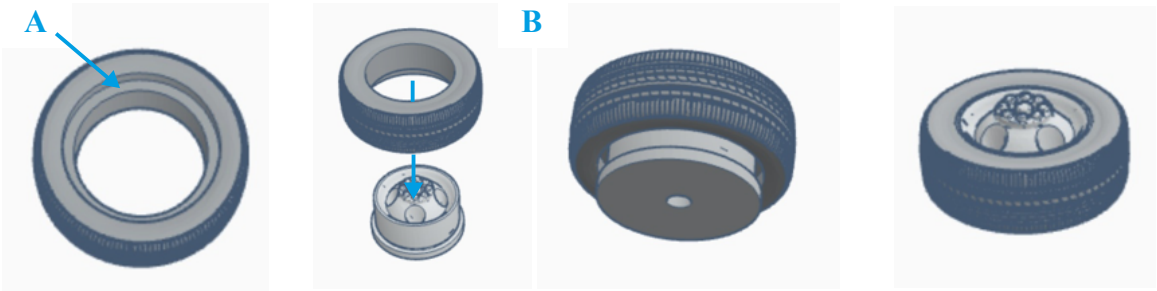
Front Wheel Components





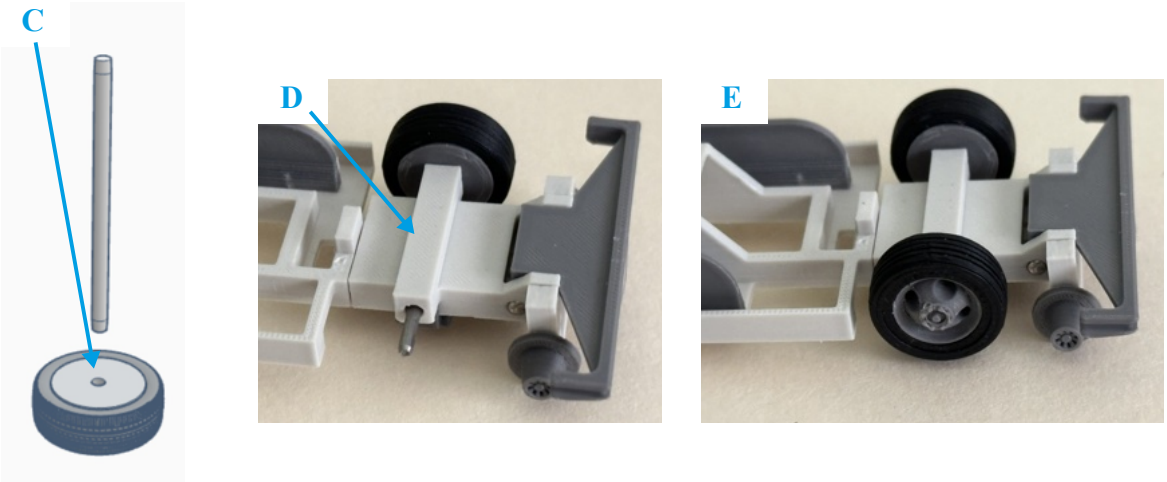
***Note**: the front tires are hard plastic and the rims have a dimple in the center of the hub.*

There is a top and bottom to the front tire. The bottom has a channel built in to accommodate the rim flange (**A**). Press fit a front tire onto a front rim with the bottom of the tire going over the top of the rim; the tire needs to go on the rim evenly (**B**). The bottom of the tire should be flush with the bottom of the rim. Repeat for the second front tire and rim.



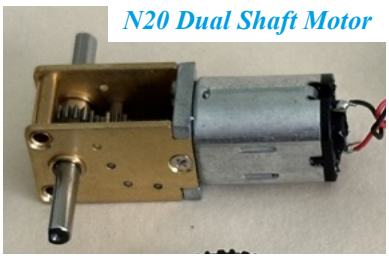
Insert one end of the 1.5 x 30mm metal dowel into one (1) of the front wheel assemblies (**C**). Insert the other end into the wheel axle opening in the front of the chassis (**D**). Press the other front wheel assembly onto the other end of the axle (**E**).

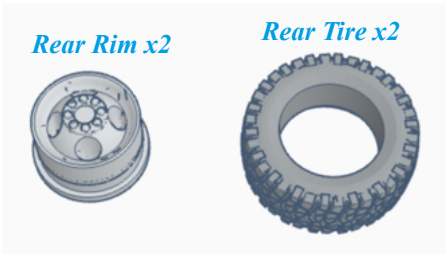
***Note**: if the wheels fit is loose, add a little dab of superglue to the end of the axle and then reinsert into the wheel assembly.*

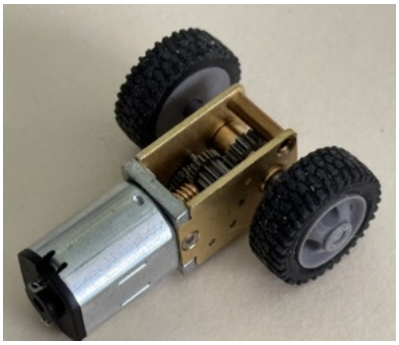


Rear Wheel Assembly - N20 Motor

Rear Wheel Components



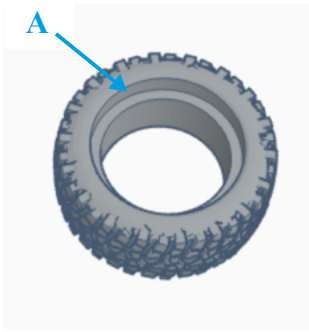


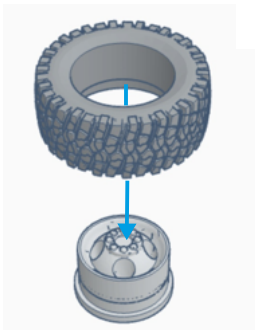


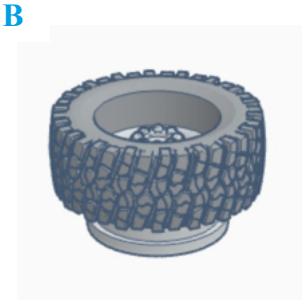
***Note**: the rear tires are soft rubber and the rims are keyed to match the motor shaft.*

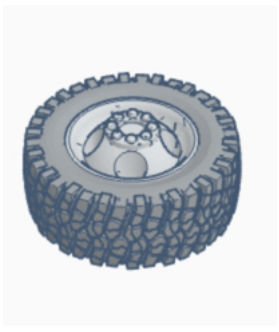
*If operating on the InvisaTrax® Transport System or using as a static model, skip this section and go directly to the **Rear Wheel Assembly - Dummy Motor** on **page 21**.*

There is a top and bottom to the rear tires. The bottom has a channel built in to accommodate the rim flange (**A**). Press fit a rear tire onto a rear rim with the bottom of the tire going over the top of the rim; the tire needs to go on the rim evenly (**B**). The bottom of the tire should be flush with the bottom of the rim. Repeat for the second rear tire and rim.

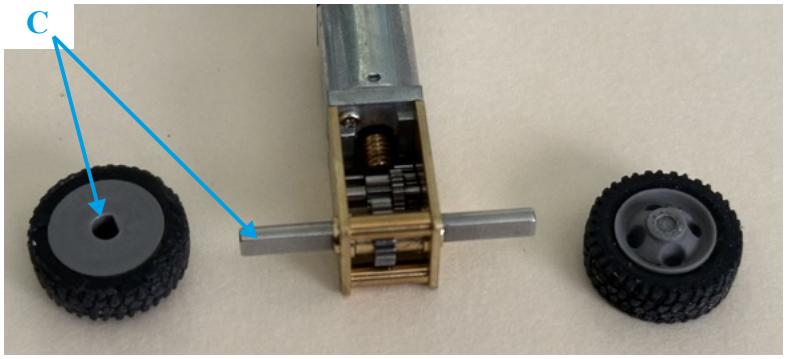


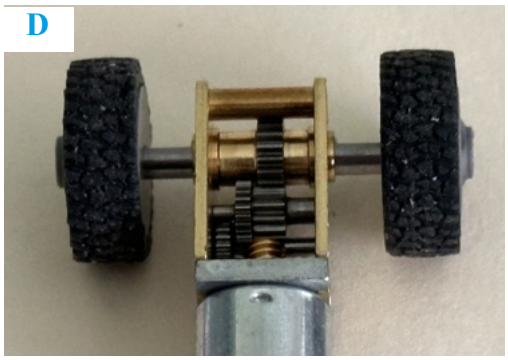






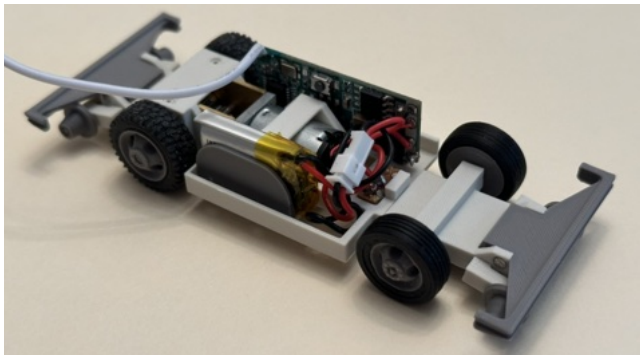
Align the rim shaft cutout with the N20 motor shaft and firmly press the rear wheel assembly onto the shaft (**C**). Repeat for the second rear wheel assembly (**D**).



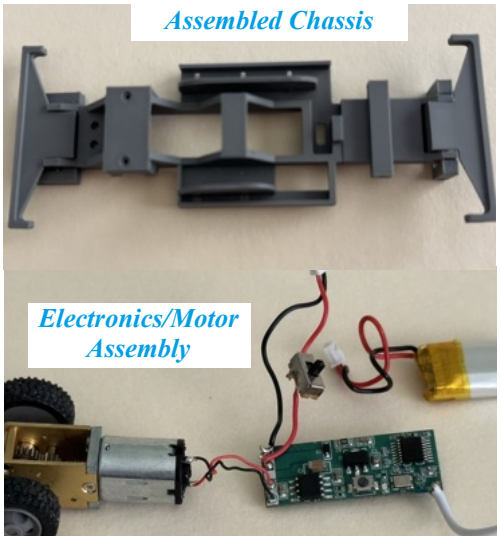


***Note:** If adding your own electronics/decodeer, skip the **Installing Electronics/Motor** section and go directly to the **Installing the N20 Motor** section on **page 20**.*

Installing the Electronics/Motor Assembly in the Chassis

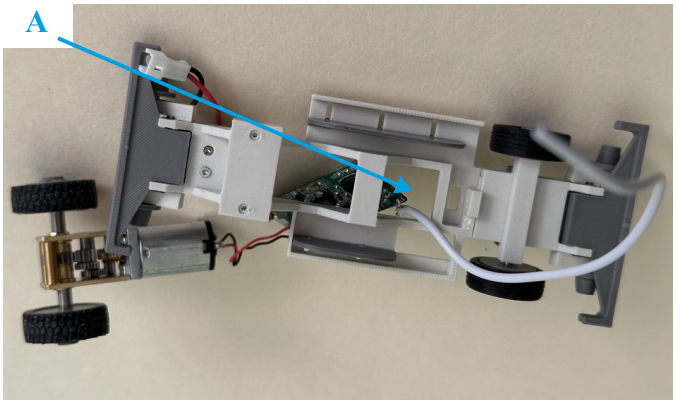


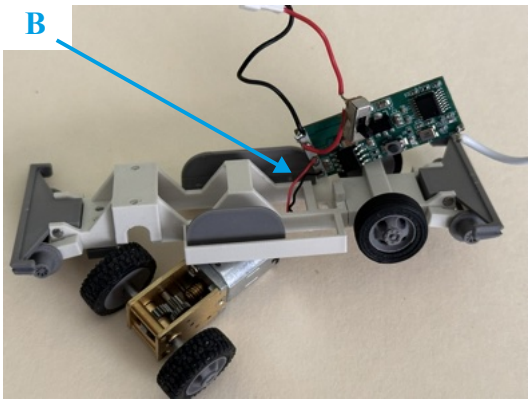
Electronics/Motor Components

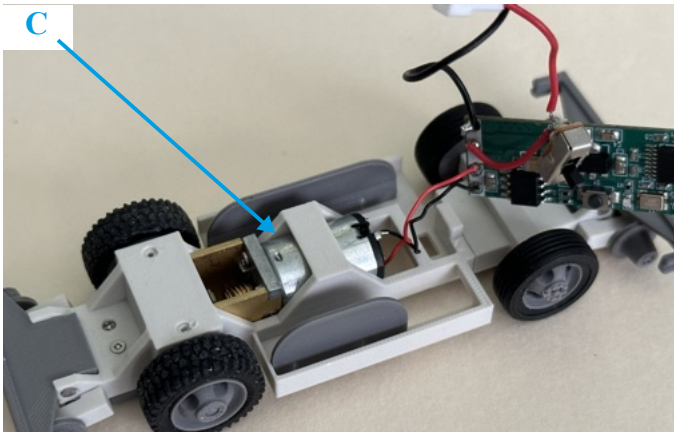


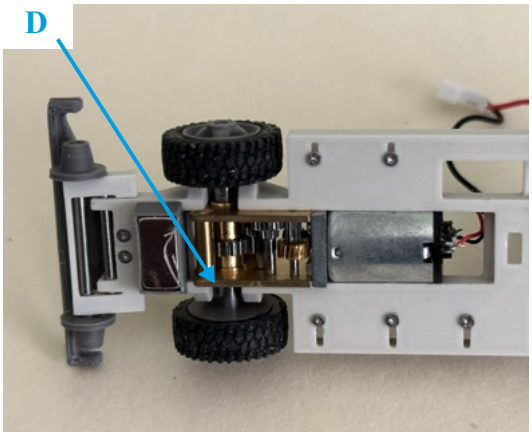
Disconnect the battery before installing the electronics/motor assembly.

Carefully feed the antenna, JST Connector, switch, and circuit board through the large opening in the front of the chassis (**A - B**). Insert the N20 motor into the motor cavity, aligning the rear wheel axle with the axle cutout (**C - D**) and press firmly in place.



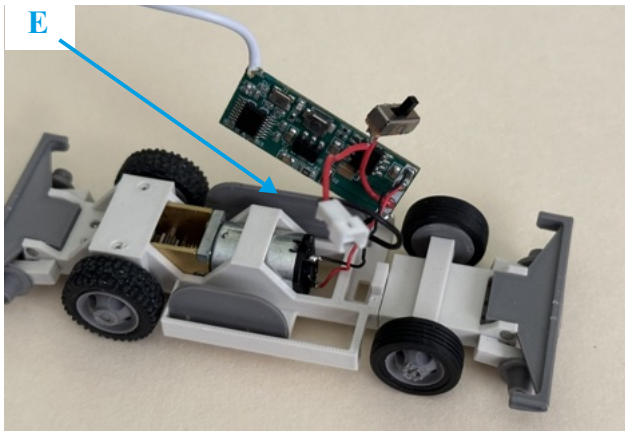


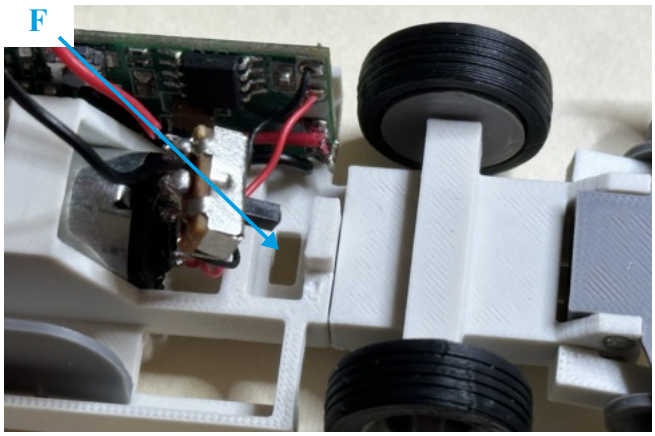


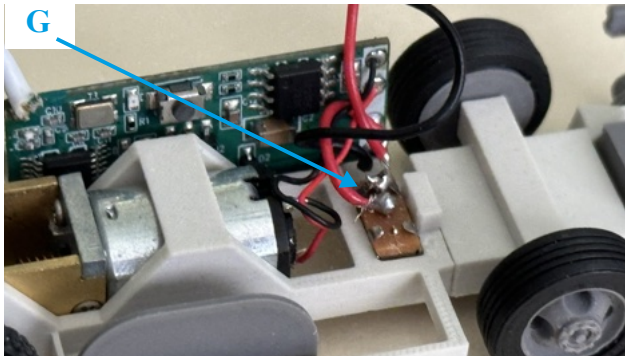


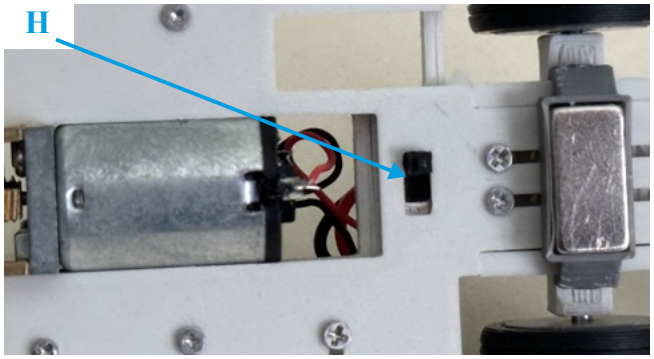
Insert the circuit board between the electronics wing and the chassis (**E**). You may need to adjust the wing position to keep the electronics in place.

Apply a very small drop of superglue to the side of the slide switch, insert the slide switch into the corresponding cutout in the chassis (**F**). Push it all they way into position (**G**) and hold in place until the glue dries. Make sure the superglue does not affect the slide switch opeation. Test the switch by sliding it back and forth (**H**) once the glue dries.

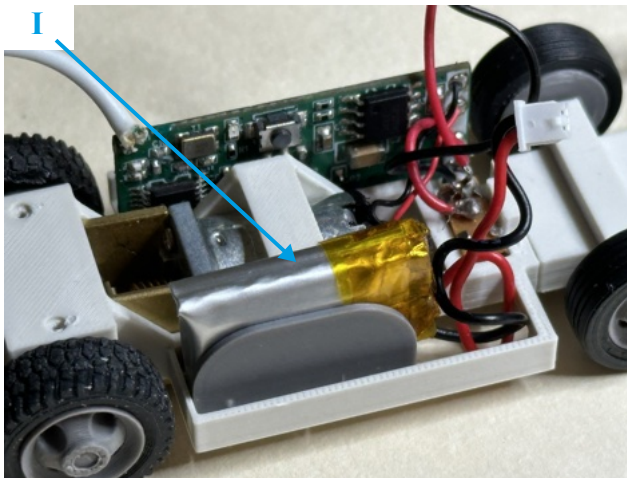


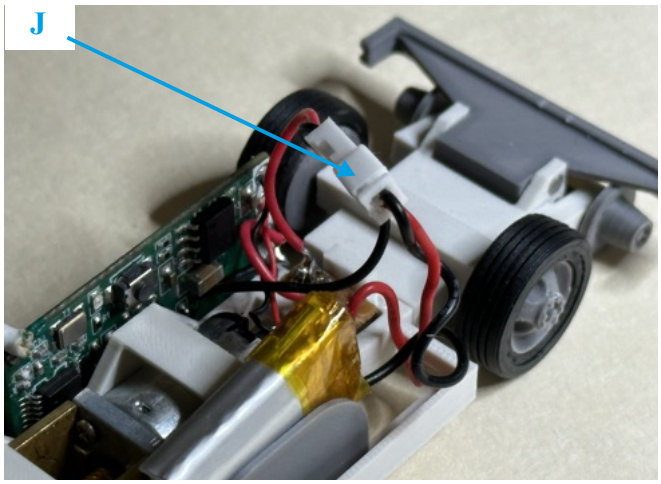




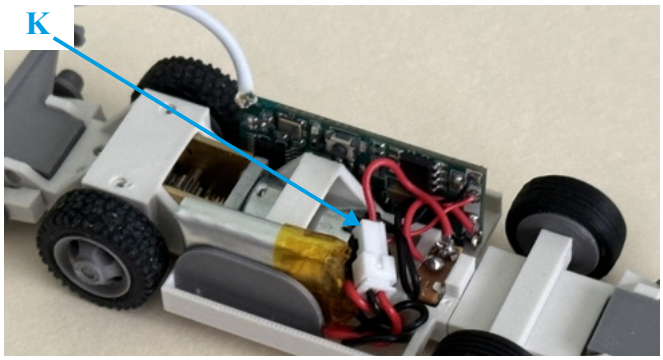


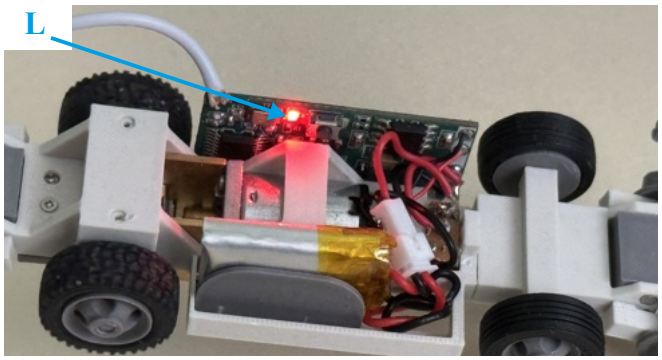
Insert the LiPo battery between the battery wing and the chassis (**I**). You may need to adjust the wing position to keep the battery in place. Connect the battery (**J**) and carefully bend the wires so the fit tighly in the chassis. You can arrange the JST plug so that you can pull it through the bottom of the chassis for recharding or leave in on top of the coiled wires for easy acces for charging when the cab is removed (**K**).

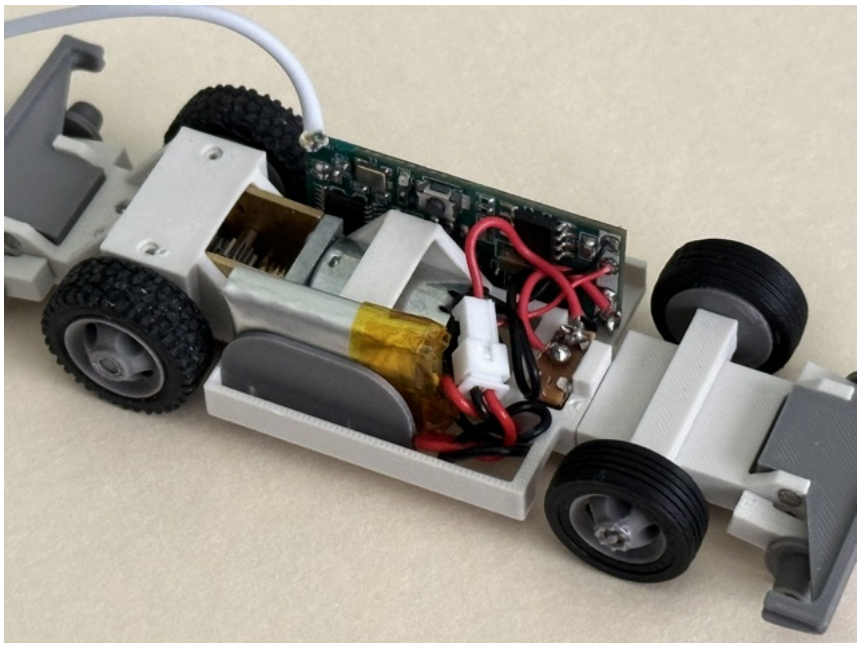




Use the slide switch to turn the power on to the motor control board. Use the previously programmed remote to test the electronics/motor assembly, confirming everything still works. When any button on the remote is pressed a red LED will light up on the circuit board (**L**). Check to make sure the motor wheels turn freely and are not rubbing on the chassis.

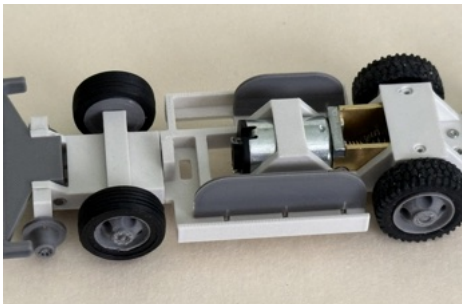




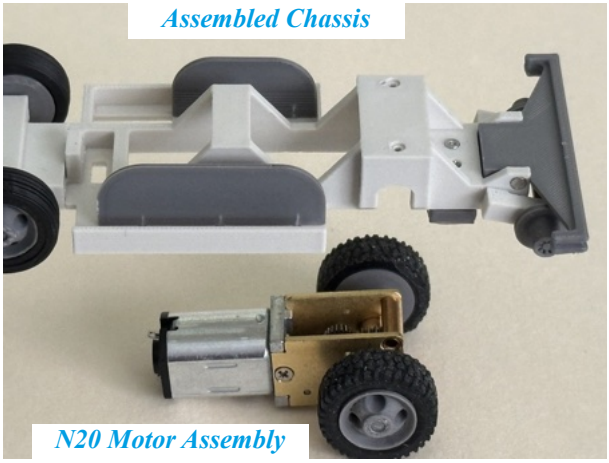


Note: *If you purchased just the* ***Motorized Chassis****, you have completed all the related assembly instructions. You are now ready to add your own vehicle body to the chassis.*

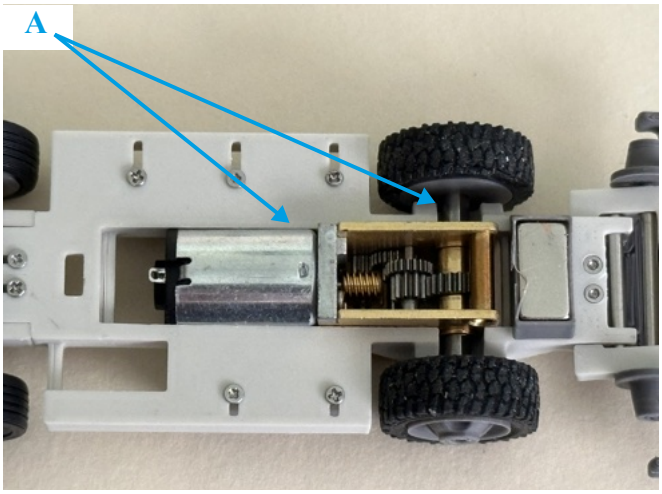
N20 Motor Installation *(this section is for those installing their own electronics/decoder)*

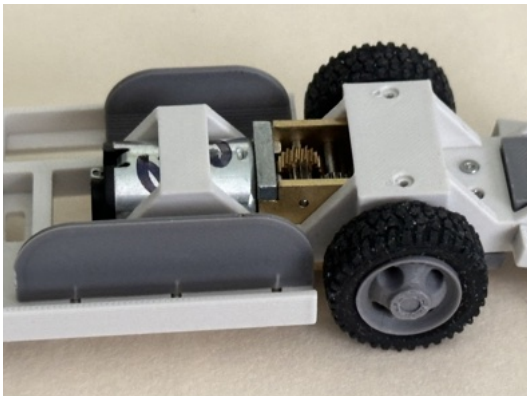


N20 Motor Components



Flip the chassis over and insert the N20 motor into the motor cavity, aligning the rear wheel axle with the axle cutout (**A**) Press firmly into place.



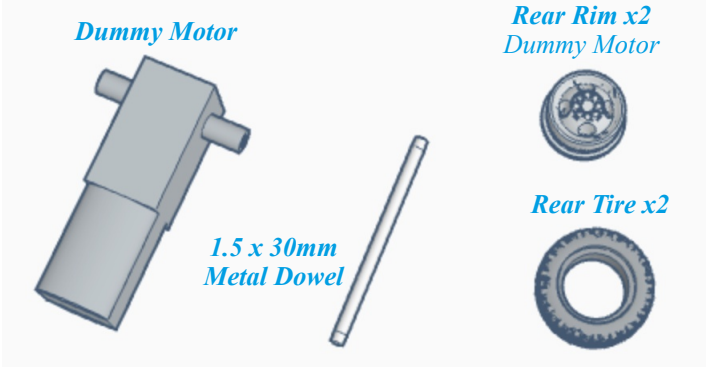


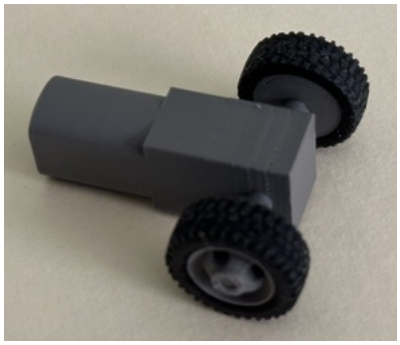
Note**: at this point in the assembly you should add your own electronics/decoder to the chassis and test the operation. You are now ready to add the vehicle body pieces; go to the **Installing the Vehicle Bed** section on **page 23.

Rear Wheel Assembly - Dummy Motor

(this section is for the Static Display & InvisaTrax® Transport System Compatible versions)

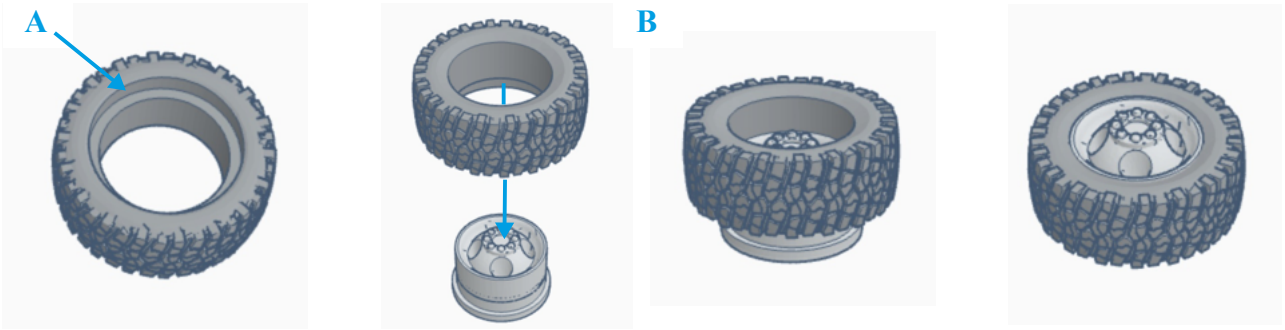
Rear Wheel Components





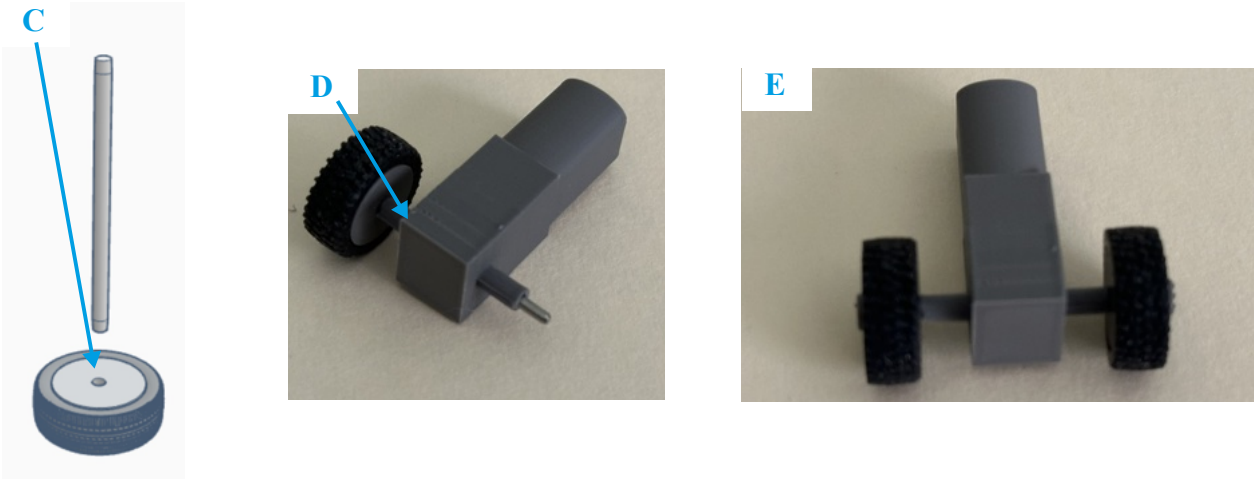
***Note**: the rear tires are soft rubber and the rims have a circular hole for metal dowel.*

There is a top and bottom to the rear tires. The bottom has a channel built in to accommodate the rim flange (**A**). Press fit a rear tire onto a rear rim with the bottom of the tire going over the top of the rim; the tire needs to go on the rim evenly (**B**). The bottom of the tire should be flush with the bottom of the rim. Repeat for the second rear tire and rim.

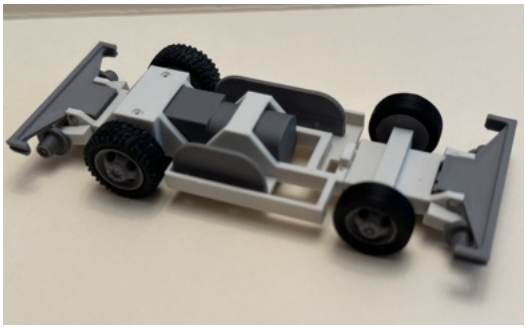


Insert one end of the 1.5 x 30mm metal dowel into one (1) of the rear wheel assemblies (**C**). Insert the other end into the axle opening in the dummy motor (**D**). Press the other front wheel assembly onto the other end of the axle (**E**).

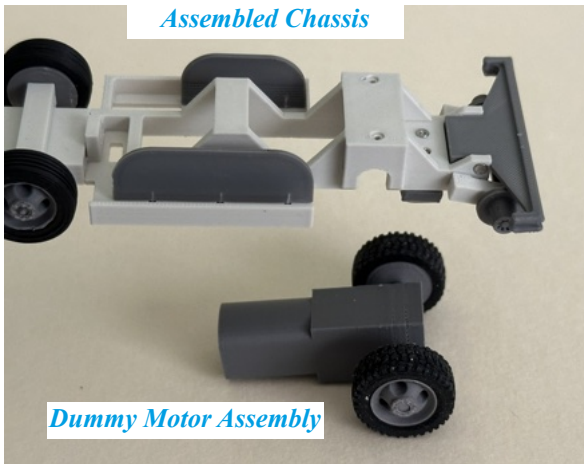
***Note**: if the wheels fit is loose, add a little dab of superglue to the end of the axle and then reinsert into the wheel assembly.*



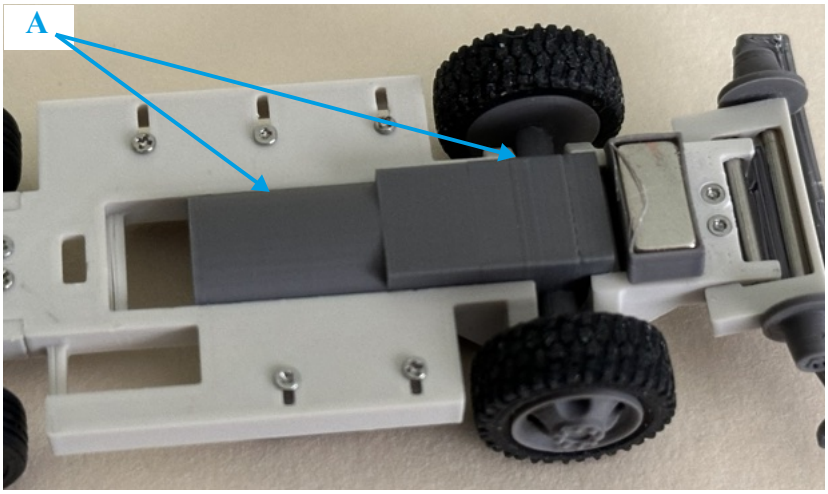
Dummy Motor Installation



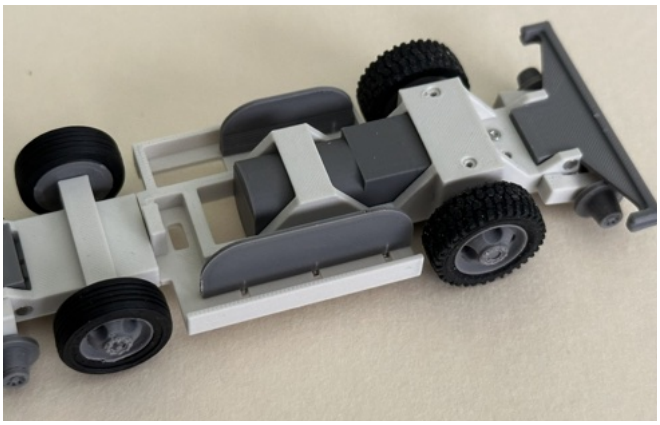
Dummy Motor Components



Flip the chassis over and insert the dummy motor into the motor cavity, aligning the rear wheel axle with the axle cutout (**A**) Press firmly into place.



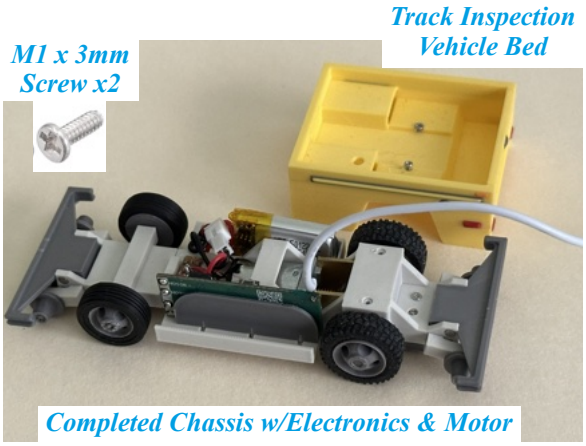
The chassis should roll freely without any binding. If any of the wheel assemblies are rubbing against the chassis frame, pull them slightly until no longer binding.



The Road & Rail Track Inspection chassis configured for the *InvisaTrax® Transport System* or as a static model is now complete. You are ready to attach the body pieces.

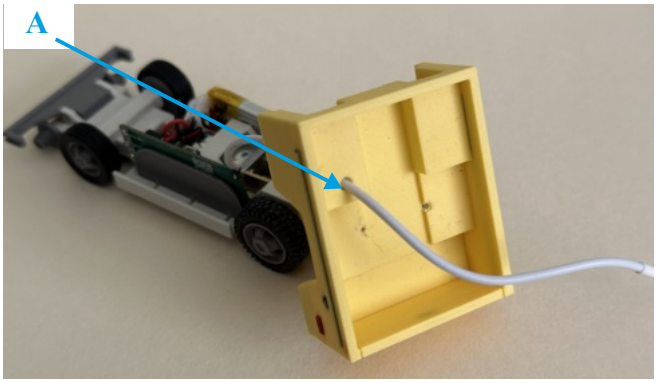
Attach the Bed to the Chassis

Bed & Chassis Components

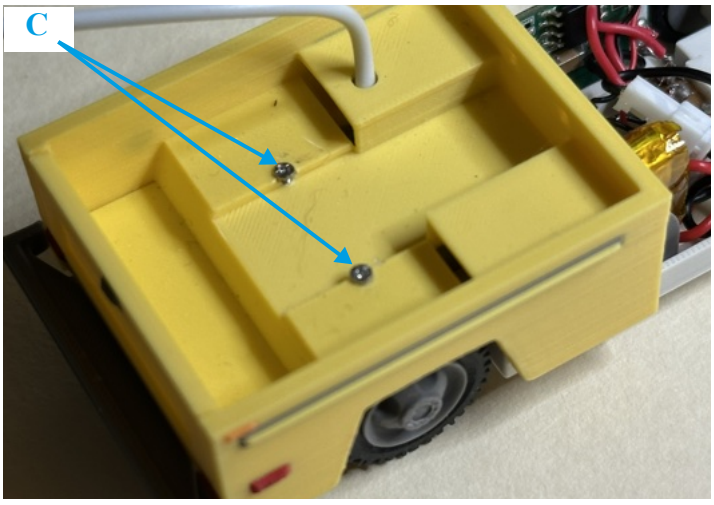


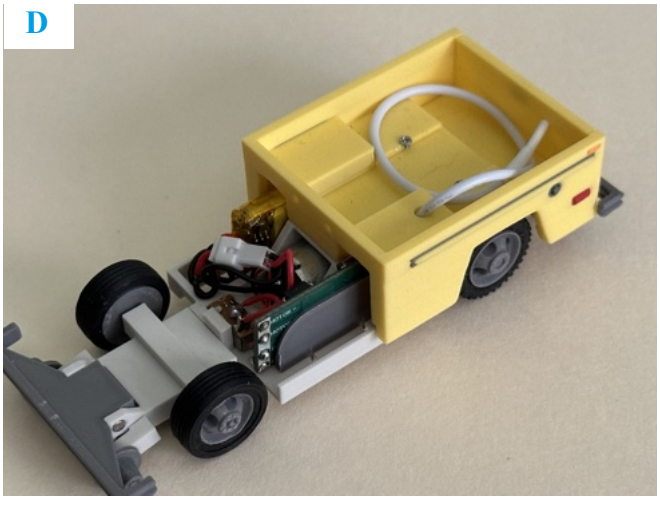
***Warning**: do not cut the antenna. Doing so will affect reliable operation. Instead, hide the antenna by covering it with a tarp or other bed details.*

Carefully feed the antenna wire through the hole in the bed (**A**). Postion the truck bed on the chassis lining up the wheel well and the mounting holes in the bed with the mounting holes in the chassis (**B**).



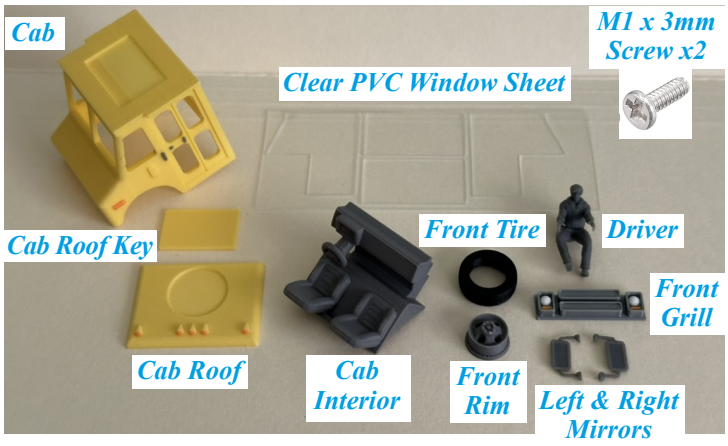
Attach the bed to the chassis using two (2) M1 x 3mm screws (**C**). Position the antenna as desired; one option is to wind the antenna and place in the bed (**D**).



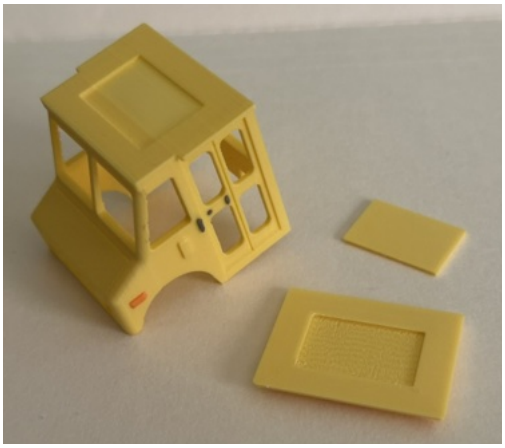


Cab Assembly

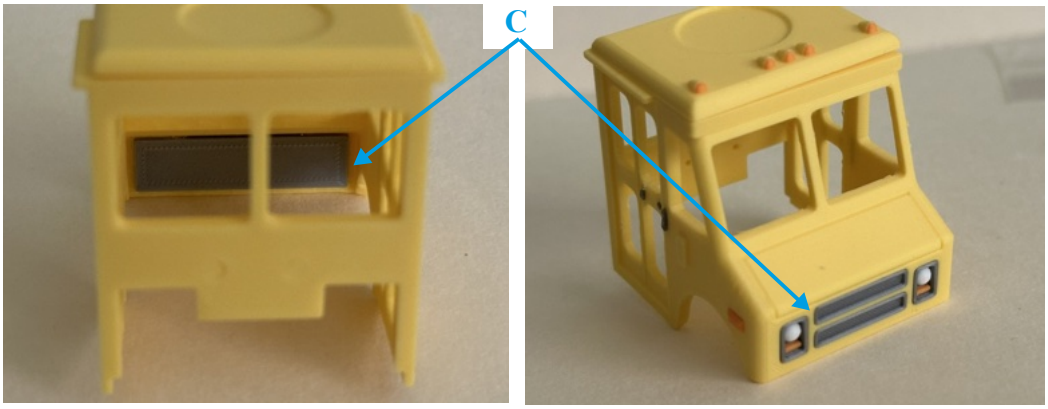
Cab Components



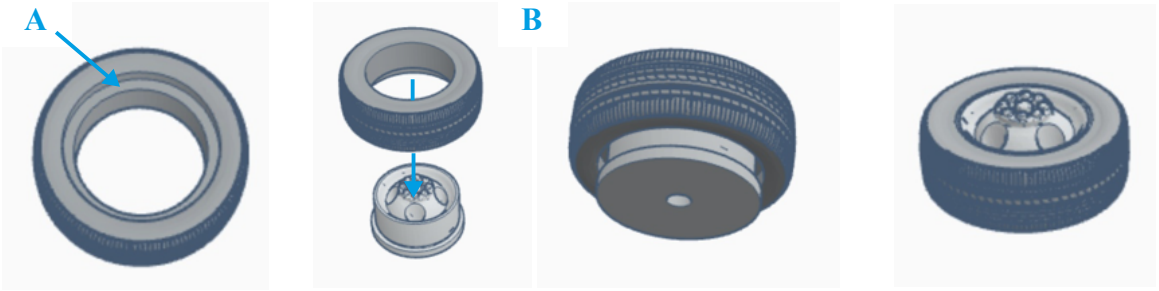
Superglue the cab roof key to the roof of the cab (**A**). Superglue the cab roof to the cab; aligning the edges of the cab roof and cab (**B**).



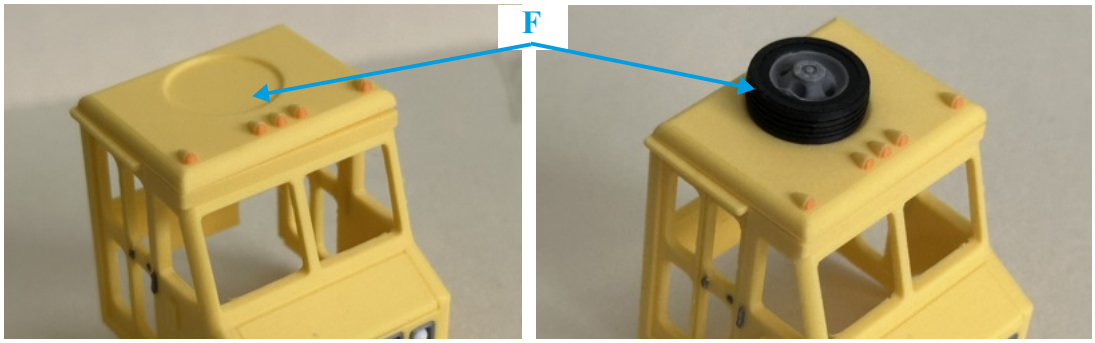
Use a small drop of superglue to attach the front grill to the cab. Insert the grill from the inside of the cab into the grill cutout. Make sure the orientation is correct with the headlights on top (**C**).



Assemble the third front wheel. Keep in mind the bottom half the tire has a channel built in to accommodate the rim flange (A). Press fit a front tire onto a front rim with the bottom of the tire going over the top of the rim; the tire needs to go on the rim evenly (B). The bottom of the tire should be flush with the bottom of the rim.

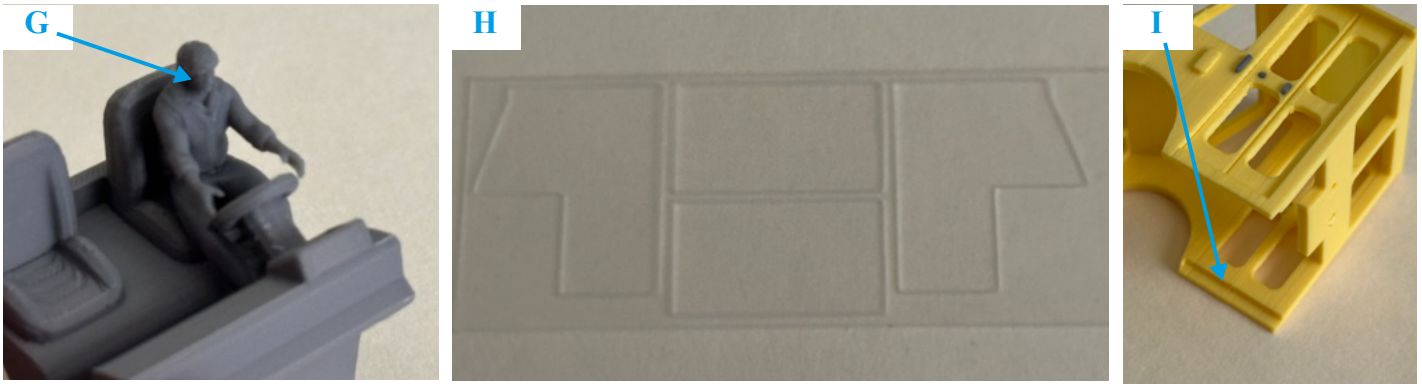


Superglue the wheel assembly to the roof of the cab; placing it in the recessed area of the roof (F).

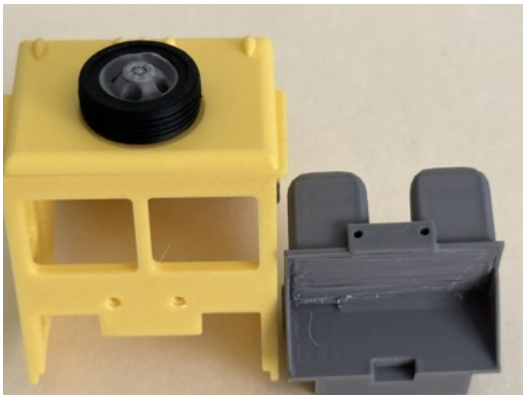


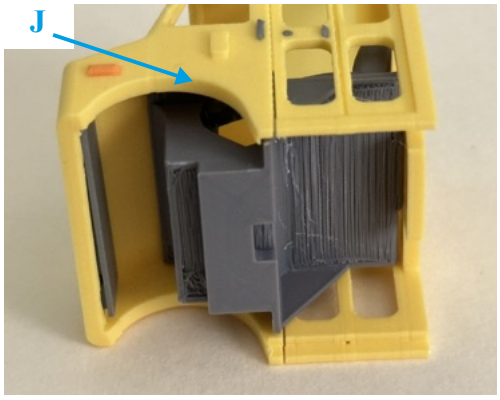
Paint the driver and the cab interior (if desired) using acrylic based paints. Place the driver in the driver's seat of the cab interior (G). He should fit snuggly with his hands on the steering wheel. If he wiggles, use a drop of superglue to attach him to the seat. Remove the paint where the two pieces will be glued together.

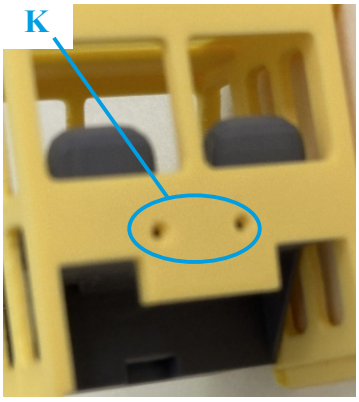
Cut the clear PVC windows from the sheet using the scored lines (H). Place the windows and secure with canopy glue or white glue. ***Note***: *check the length of the side windows and trim the bottom if necessary. They should not extend below the bottom edge of the side door into the recessed area allotted for the chassis* (I).



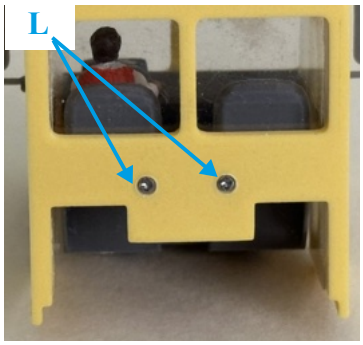
Place the cab interior into the cab (**J**). The front angle of the interior should fit up against the angled area of the cab hood and the rear mounting holes should align with the mounting holes in the cab (**K**). If desired, you can use a small drop of superglue on the angled areas to help hold the interior in place.



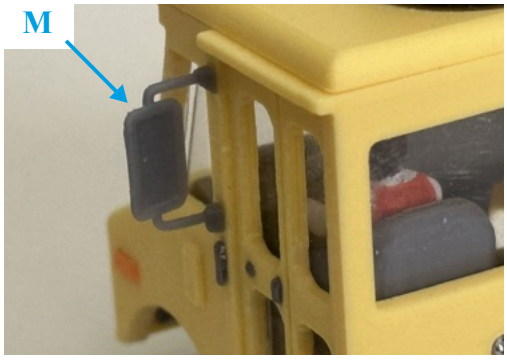


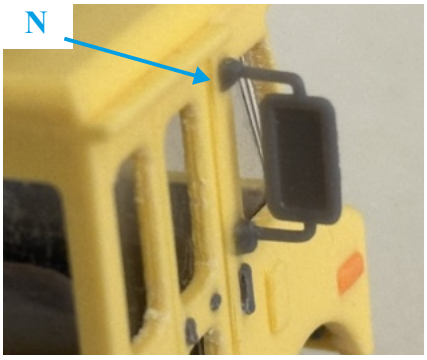


Attach the interior to the cab using two (2) M1 - 3mm screws (**L**).



Using superglue, attach the left (**M**) and right (**N**) mirrors to the sides of the cab, between the side window and the door. ***Note**: the extended area of the feet should be facing downward (**O**).*





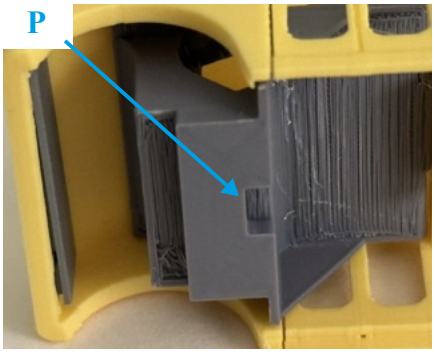
The Road & Rail Track Inspection cab is now complete and ready to be attached to the chassis.

Attach the Cab to the Chassis

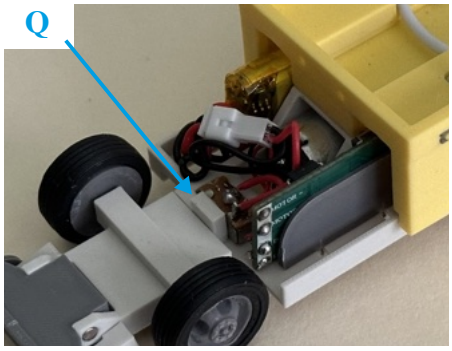
Place the cab onto the assembled chassis. There is a cutout in the bottom of the interior (**P**) that aligns with the tab in the chassis (**Q**). Press down until the cab is fully seated on the chassis (**R**).

***Note**: the cab should have a snug fit but not tight as it is meant to be removable to allow for battery access.*

P



Q



R

Congratulations!
Your InvisaTrax® Road & Rail Track Inspection Vehicle is ready to run!

Notes

Thank you!

Again, we want to thank you for purchasing the *InvisaTrax® Road & Rail Track Inspection Vehicle*. This is the first release and we would love to hear from you about your experience with the kit. You can email your feedback, photos, and vidoes (we love photos and videos) to **info164@catzpaw.com** or post your comments and photos/videos on our InvisaTrax® FaceBook Users Group (https://www.facebook.com/groups/250085354806935).

