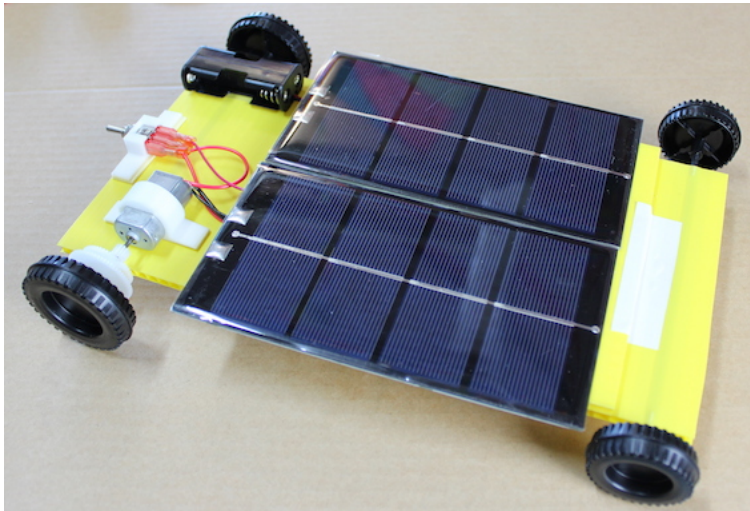


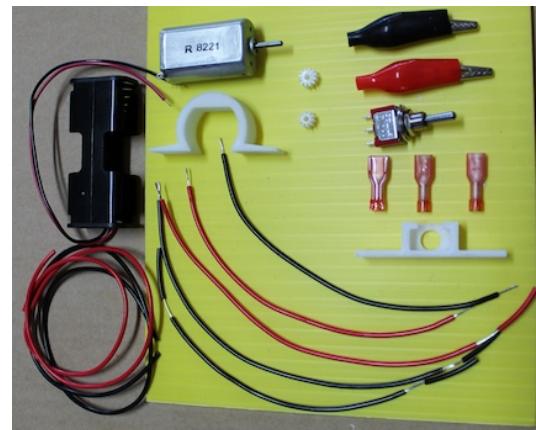


# MiniSprint Kit Solar Car Kit



## Each Kit includes

- 2 Solar Panels - 2v 700mA
- 8 Wheels 4 x 50mm, 4 x 40mm
- 2 Axels(short & Long) & 4 Axel Collars
- 1 Motor - F18 & 3D printed mount
- 3 Large Spur Gear 60T, 54T & 48T
- 2 Small Pinion Gear for the motor 12T & 10T
- 5 Pieces of wire + spare wire
- 1 Chassis(Coloured Coreflute)270mm x 140mm
- 1 Battery pack( 2 x AA)
- 1 Two Way Switch,centre off+3D printed mount
- 3 Red Spade Connectors for switch
- 2 White tape, to hold panel & battery pack
- 2 Alligator clips for solar panels
- 5 Double sided tape



## Aim of this kit.

This kit has been designed to allow experimentation and variation. To build a four wheeled car you do not need eight wheels but if they are different sizes this may effect the speed or the look of the car? Initially you can twist or push fit all the components to make it work. However to improve the durability and engineering you may need the tools below to make a really strong and fast car. The kit also provides all the components you will need to enter the Hunter Mini EV Festival or the MiniSprint competition at UNSW. For more details visit [www.sunsprint.com.au](http://www.sunsprint.com.au) or <http://www.hunterevfestival.net/mini-ev-prize.html>

## Tools you may require.

The tools you may need to help put your car together are a pair of pliers, screwdriver and although not necessary a soldering iron can help make connections more permanent and secure. Wire strippers will help with cutting and stripping the wires. Pliers or crimpers can help with connections. We provide the block of wood and dowel.



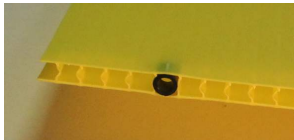
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## Steps to put your Model Car Together

These steps are only one way to put the car together, its up to you to experiment.

1. First, lets set up the chassis. We have included eight wheels and you can select and test which ones will be appropriate. There are two axels, the motor will drive one and the other will be free running. The axels go through the corflute and to stop the loose fit you can use the small axel collars placed inside the corflute to act as bearings. See the picture. To push the axel into a wheel use the wooden dowel with a hole in it to firmly push the axel into the wheel (Use the shorter axel). See picture. Slide the axel through the corflute and place the same size wheel on the other side.



The longer axel will need a spur gear on it so the motor can drive the axel. To push the axel into one of the large gears you will need both wood pieces. See picture. Place the spur gear over the hole on the flat block and push the axel into the gear. The axel should just protrude through the gear and then you can push it onto a wheel. Place the two collars into the corflute and then slide the axel through the corflute and push a wheel onto the other side of the axel. You can just do one spur gear at a time or you can load up the axel with more than one. You might need to adjust the position of the spur gear to stop wobble from left to right.

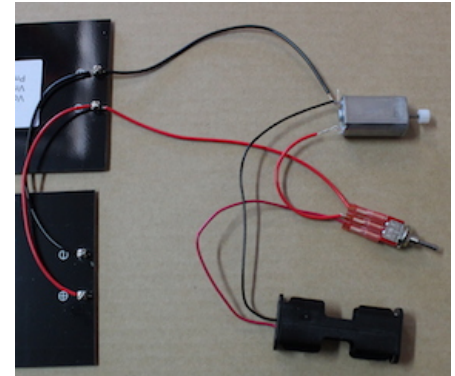


2. Test that your platform rolls smoothly across a flat surface. Also test to see if it goes in a straight line. The engineering side of this build is most important.
3. You now need to build the circuit but before you do the motor needs to have the pinion gear pushed onto it. There are two gears for the motor, a 10 and 12 tooth gear. Again testing will be required to decide which gear is best. Place the small gear onto the bench and then push the motor into the gear. Be careful not to push on the back of the motor where the two connection points for the wires are as they can be pushed into the motor and it wont work. Take a moment to think about how many gear ratios you can create.
4. You now need to set up the wiring. You might find it helpful to connect all the elements together and test them before you secure them to the chassis.



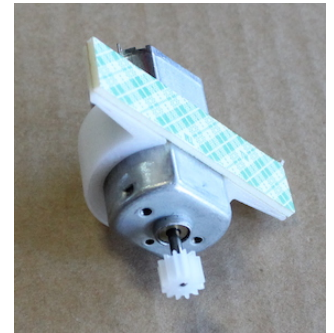


5. On the last page of these instructions is a wiring diagram. You will need to read and understand it so you can connect up the circuit. There are two ways to connect the solar panels, series and parallel and they give different outputs for voltage and current. You will need a small flat screwdriver for the solar panels connections and either pliers or crimpers for some of the other connections. A picture of the parallel circuit is to the right.

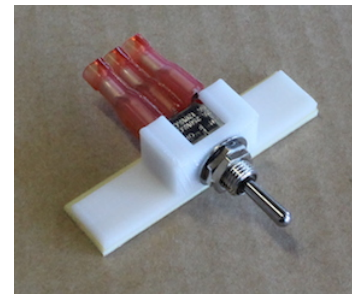


- We have provided 5 single wires plus a small roll just as extra. The single wires have tinned and stripped ends.
- The connectors for the switch are the small red spade connectors. Insert the wires into the connector and then clamp with pliers or crimpers.
- Be careful of short circuits, wires touching each other.
- You will need to test various set ups so lay the wires out first before securing them. You will need to think about how to make changes once you have the components in place.

6. The kit comes with two 3D printed mounts, one for the motor and one for the switch. The motor one slides onto the motor. Then fix one of the double sided tapes to the mount to secure it into place. For the switch mount you will first need to take off all the nuts and washers from the front of the switch and then slide it into the mount. Then replace the nut and washer. See the pictures to the right.



7. Now with all the components set and an understanding of the wiring you will need to design the layout of your car. There are many ways to do this and we have also included spare wire so you might choose to change lengths so items can be positioned in different places. This can all be changed but spend some time to think about where the best place might be for each component. Draw a sketch of the layout.



8. Its now testing time but this is only the beginning. Start to make a list of all the variables so you can get an understanding of just how much testing it will take to totally figure out this car and what it is capable of in different sun conditions.

9. If you want to race the car down the track you will need to set up a method of keeping the car on the track. Some form of guide will be needed. This part is up to your imagination.

10. While this is a kit there are items you can change or things you can add to make improvements. See how many ideas you can come up with.

## Warning

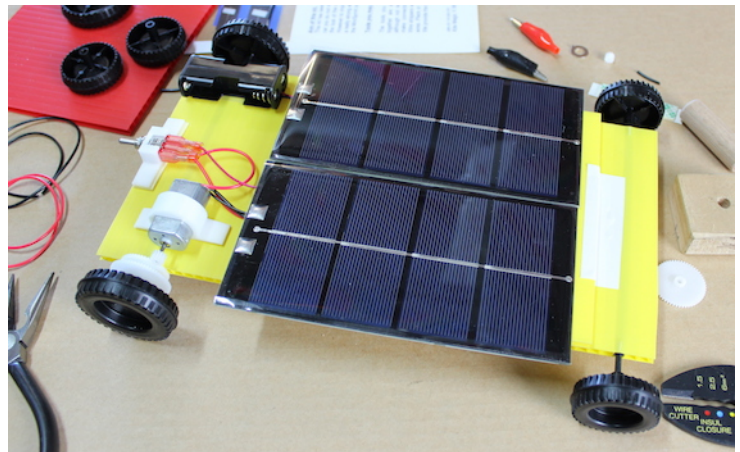
When you put the batteries in the holder please ensure you do not touch the two leads from the battery holder together. The batteries will get very hot and smoke. Also make sure you do not have any short circuits in your wiring. If you are unsure do not place the batteries in the holder until you get help or advice. This can be dangerous.

## Some Tips and Ideas.

1. IF you are using the kit to enter a competition please read the rules for the current year.
2. The kit and these instructions are just a guide to making a car which will work. You are free to make your car any way you like as long as it fits inside the rules.
3. Testing the car with different gear ratios and different light conditions is most important.
4. The biggest mistake is incorrect alignment of the motor to the gears on the axel. If they slip you will end up with no movement.
5. Electrical connections need to be secure. Once you have the car set up check you have made them as secure as possible.
6. The track is now a 16mm wide U channel. Your guides need to keep your car on the track.
7. We do have spare parts and if you need any further help please contact us.
8. Please try and reuse the packaging. Lets think of good ways not to create waste and try to save our resources.
9. If you have any questions or feedback we would love to hear from you.

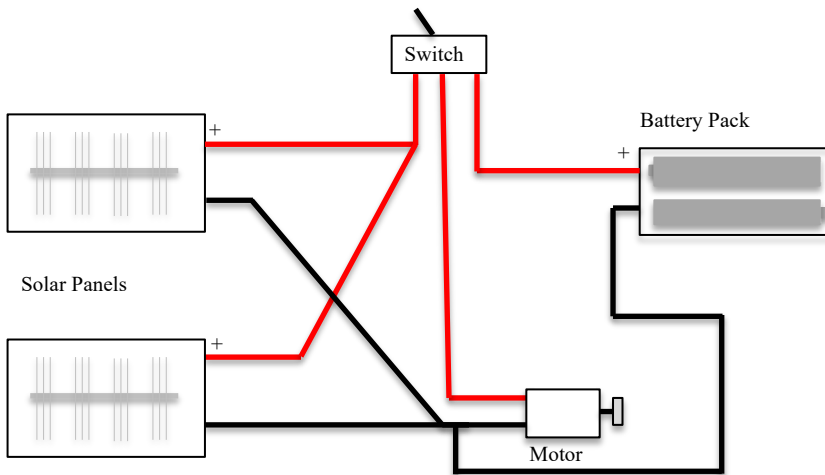
All the best and above all have fun.

Michael Richards



# MiniSprint Solar Car Kit – Wiring circuit diagram

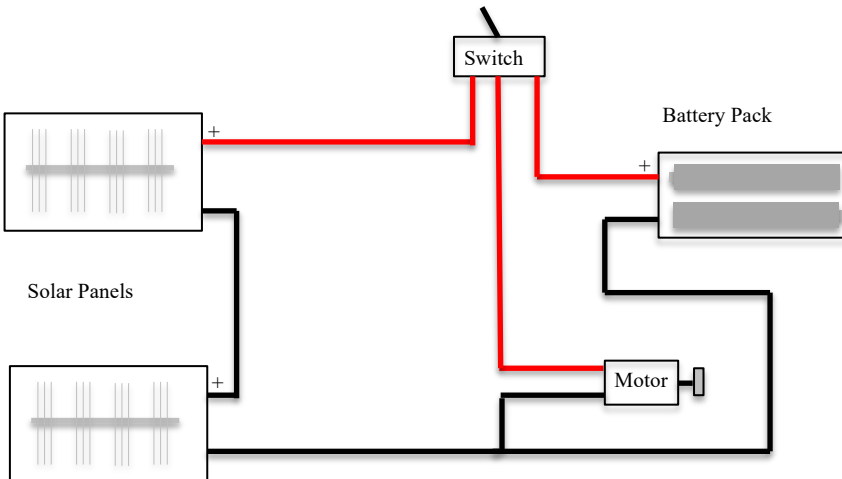
## Solar Panels in Parallel



With the panels connected this way what is the output to the motor?  
\_\_\_\_\_ Volts    \_\_\_\_\_ Amps

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## Solar Panels in Series



With the panels connected this way what is the output to the motor?  
\_\_\_\_\_ Volts    \_\_\_\_\_ Amps

**Use a multimeter to test these two circuits. Also test under different sun conditions. Remember to record your data.**