ATV 4-wheeler 6V Ride-on Car Modification

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Introduction

• This GoBabyGo! Project build is for Jairo. He had nothing below thoracic vertebrae 12 (so good with arm and shoulder movement) will need support for sitting, lower limbs are not functional. Our goal is to build and design a car that meets her needs.

• We are a team of students from Wichita State University in the course ENGR 202 Service Learning in Engineering in Fall 2016.

• This is a multidisciplinary class project that involves students from engineering and volunteer students from physical therapy. The children for whom we are building this car receive their therapy services from Rainbows United, a non-profit organization that provides center based, community based, and home based service options for young children with special needs. The child’s licensed Rainbows physical therapist advised our team on measurements and modifications for the child.
How to get the most out of your car

⚠️ DO NOT use your car for the first time without having it checked by an electrical engineer or other professional.

⚠️ DO NOT use a battery if the wires or casing shows any sign of damage or modification.

⚠️ DO NOT allow the child to use the car unsupervised.

⚠️ DO NOT use the car outside in any inclement weather or leave the car outside in such weather.

⚠️ DO NOT use the car if you smell or smell smoke.

⚠️ DO NOT leave the toggle switch in the ON position when the car is not in use.

⚠️ DO NOT TAKE ANY UNNECESSARY RISKS WHEN USING OR MODIFYING THE CAR!

⚠️ DO contact a clinician about your child’s use of a modified ride-on car and involve him/her in the modification process and later ride-on car use.
Prior to Modifying

⚠ Please always wear safety glasses and be sure to wear gloves to remove plastic burrs.

⚠ Always be aware of where your fingers and hand are during the modification process, especially when drilling or using PVC Cutters.

⚠ Do not use wire of a gauge higher than 16. A higher gauge means thinner wire, which may run this risk of causing overheating and wire melting.

⚠ When stripping wire, make sure to cut only through the plastic tubing and not the wire itself. Also, make sure to strip only enough wire so that you do not leave wire exposed when connecting wires together.
  o Cutting too deep into the wire or leaving unprotected wire may cause sparks, short circuits, and overheating. Always use wire strippers and not scissors.
  o Please note that you should never cut wires on the battery.

⚠ Please cover any wire nuts and crimp terminals with electrical tape.
Equipment: Tools and Hardware

- **Tools**
  - Power drill
  - 1”, ½”, ¼” drill bits
  - Wire cutter
  - 16 gauge wire stripper
  - Wire crimper
  - Phillips head screwdriver
  - Flat head screwdriver
  - PVC cutter
  - Pliers
  - Scissors
  - X-acto blade/cutting tool
Tools and Hardware

- Hardware:
  - Bolts
  - Nuts
  - Blue Pool Noodle
  - 3/4” PVC Pipe (10’ section)
  - PVC Elbow connectors.
  - Zip Ties
  - WSU Sticker
  - Tape Measure
  - Car seatbelt
  - 4 inches of Velcro.
  - Double basket
Hardware (Cont.)

- Electrical: –
  - 2-ways switch.
  - (4) Ring Crimp Connectors
  - Wire Nuts
  - 10-12 Gauge Wire
  - Female Crimp Connectors
  - Male Crimp Connectors
  - Electrical Tape/Duct Tape
MODIFICATIONS

- The stock car lacked reverse gear, therefore an installation of reverse gear was required.

- The charging port was re-oriented to the front from the rear.

- An intuitive seat belt design incorporating velcro has been implemented that prevents the seat belts from sagging when the child isn’t buckled in.
Moving Charging Port.

Step 1: First you need to splice the wires leading to the charging port, adding in the needed length to place the charging port in the desired location.

Step 2: We used black and red wire so that we will know whether they are on the right side or the left side.
Moving Charging Port (Cont.)

Step 3: Use wire nuts or crimps to secure the lengthened charging port.

Step 4: Attach the main red terminal to one of the poles on the side, attach the main black terminal to the pole right next to it.
Moving Charging Port (cont).

Step 5: Attach the red jumper connector to the opposite corner, and the black jumper to the other corner to form an “X” across the switch.

Step 6: Similar to the last step take another wire that will go to the +12 V DC. We using red wire. Attach this to a disconnect terminal.

Step 7: Do the same with another piece of wire. Black will go the ground.
Moving Charging Port (cont).

Step 8: Attach these to the center poles of the switch.

Step 9: Testing before installing switch.
Adding reverse functionality

- Replacing the momentary on/off switch with a double-pole double-throw rocker switch will allow for reverse functionality.
Adding reverse functionality (cont).

- Following the link to this inscrutable will allow you to see a basic wiring diagram of the new electrical circuit.
Theory

- The switch button is being used as a means of forward/reverse control.

- A seatbelt to support the body while controlling the car.

- A kill switch in the back for his parent to stop the car down.
WARNINGS

• If you smell smoke or notice any burning/melting, UNPLUG IMMEDIATELY!

• Pay close attention for any weird smells, actions from the motor etc.
Finished!