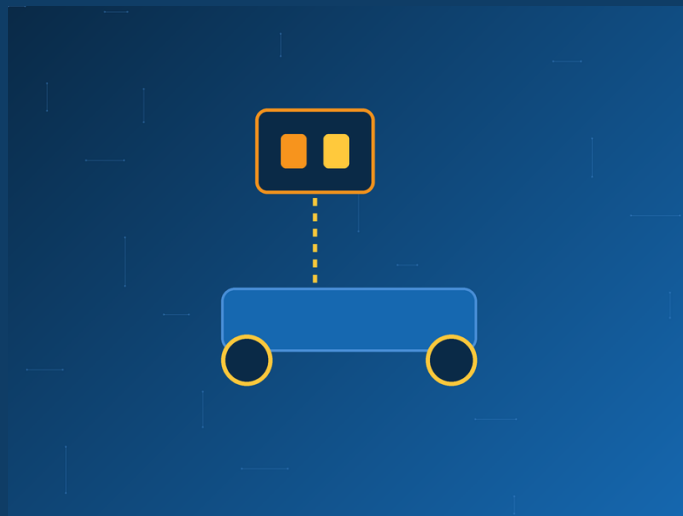


STAGE 1

Remote-Control Robot Car

Build and remote-control your first robot car using DPDT switches.



Skill level: Beginner

Recommended age: 8+

Hands-on builds: 4

What you'll build

This manual walks through assembling and programming the **Stage 1: Remote-Control Robot Car** step by step, alongside a full materials list and the original circuit diagram. It's a companion to — not a replacement for — the kit's original build guide, which is linked from the product page for reference.

#	Project	What it teaches
1	Switch-controlled LED	Wire a single LED and 1K resistor to the battery through one DPDT switch, to see how flipping it reverses current direction before you touch a motor.
2	Two-motor test rig	Wire both BO motors to their own switch on the breadboard and confirm each spins forward and backward on command.
3	Assembled chassis	Mount the motors, wheels, and caster wheel onto the bot chassis so it's ready to carry its own power source.
4	Complete remote-control car	Combine the wired switches into the handheld remote box and drive the finished car forward, backward, left, and right.

Note: This kit uses only switches, batteries, and motors — there is no microcontroller and nothing to program. All movement is controlled directly by the two DPDT switches.

What's in the box

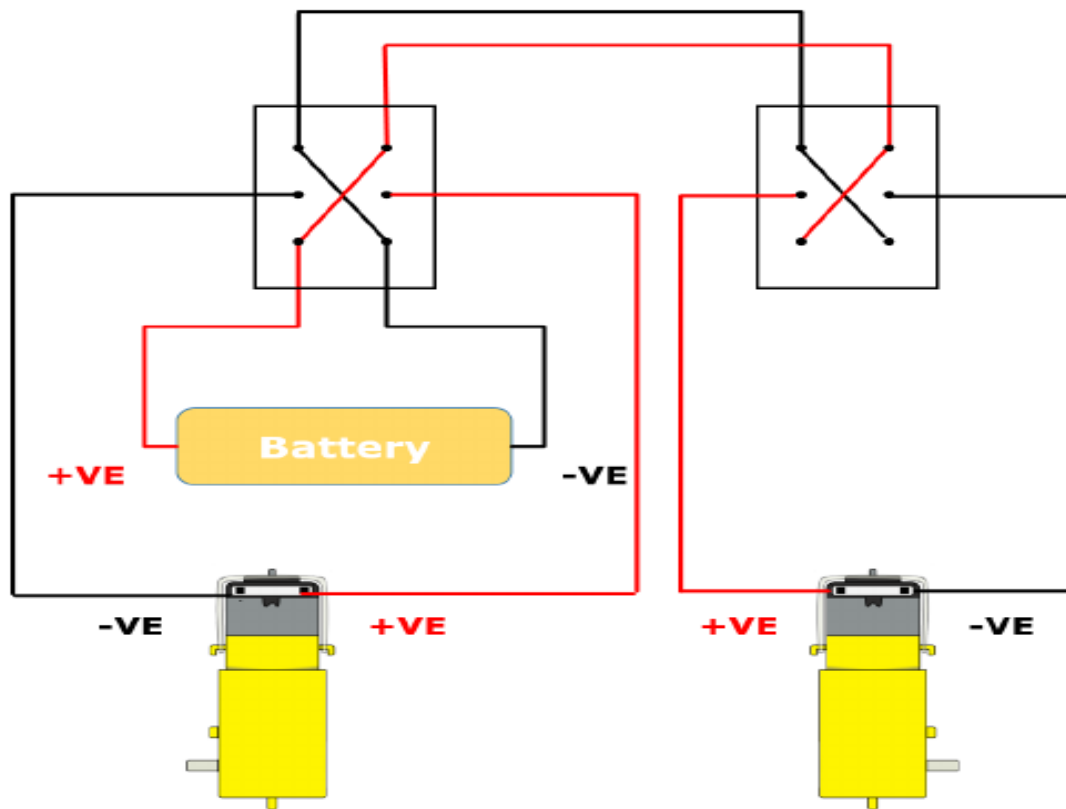
13 line items. Check every part against this list before you start building.

Item	Qty	What it's for
Bot chassis	1	The frame every other part mounts to.
Wheels	2	Fit directly onto the drive motor shafts.
Caster wheel	1	A free-spinning third wheel that balances the chassis without needing its own motor.
DPDT switch	2	Flipping this double-pole switch reverses current through a motor, making it spin backward.
DPDT remote box	1	Houses the switches so the car can be driven by hand from a distance.
BO motor	4	Geared DC motors that turn the wheels.
Breadboard	1	A solderless board for testing the wiring before it's final.
8-core wire	1.5 m	Multi-strand cable carrying power between the remote box and the chassis.
AA battery holder	1	Holds the 4 AA cells that power the circuit.
AA batteries	4	The kit's power source.
LED	8	Used in the practice circuit to visualise current flow before wiring a motor.
1K resistor	4	Limits current to the LEDs so they don't burn out.
Screws, tape & zip ties	1 set	Mounting hardware for the chassis and tidying the wiring.

Step-by-step build instructions

1	Unbox and check parts Lay out every part against the materials list on the next page before starting.
2	Build the chassis Attach the two drive motors to the chassis mounting brackets, then push a wheel onto each motor shaft. Screw the caster wheel into place for a stable three-point base.
3	Fit the battery holder Mount the 4xAA battery holder to the chassis and insert the batteries. Leave the wires disconnected for now.
4	Practice with an LED On the breadboard, wire one LED in series with a 1K resistor across the battery holder's +/- rails and confirm it lights. Disconnect before continuing — this step is just to build wiring confidence.
5	Wire the first switch Following the DPDT Switch Connections diagram on page 4, wire the first DPDT switch between the battery and the left motor so flipping it reverses that motor's direction.
6	Wire the second switch Repeat the same wiring pattern for the second DPDT switch and the right motor.
7	Build the remote box Mount both switches inside the remote control box. Run the 8-core wire from the box to the chassis, matching +VE (red) and -VE (black) exactly as shown in the Complete Circuit Diagram on page 5.
8	Bench test With the wheels off the ground, flip each switch individually and confirm forward, backward, and that each side can be stopped independently.
9	First drive Set the car down and take it for its first test drive. Re-check any wire that makes a motor spin the wrong way — swapping its two connections fixes direction.

Circuit diagram



Troubleshooting

Symptom	Fix
A motor spins the wrong way	Swap its two wire connections at the driver board or switch.
Nothing powers on	Check battery orientation first, then confirm every switch or connector is fully seated.
Bluetooth won't pair (Stage 3)	Confirm the HC-05's LED is blinking (pairing mode) and try the default PIN, 1234 or 0000.
Pico isn't recognised by your computer	Hold the BOOTSEL button on the Pico while plugging in the USB cable, then release it once connected.
Line follower loses the line on curves (Stage 4)	Lower the sensor height slightly, slow the motor speed, or widen the gap between the two sensors.
Ultrasonic sensor gives erratic readings (Stage 5)	Make sure nothing else is close enough to cause echo interference, and double-check the Trig/Echo pins aren't swapped.

Need more help? Email our STEM instructors or visit the FAQ at streamedutech.com. The original source build guide for this kit (with the manufacturer's own circuit reference) is linked from this kit's product page alongside this manual.