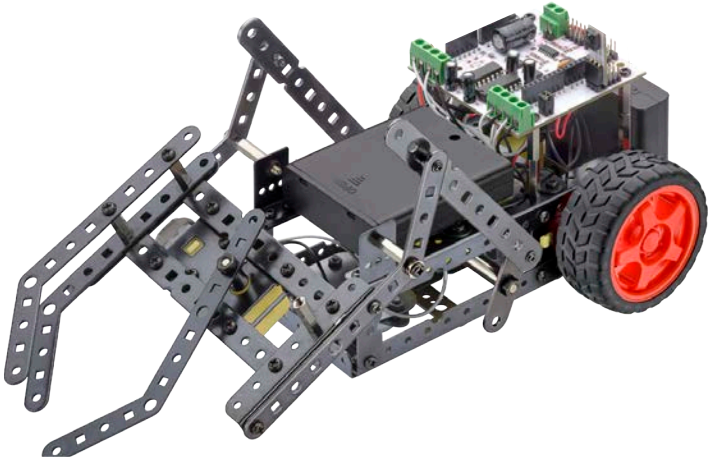
Make: it

Robotics Add-On Project Kit 2

2770170 User's Guide



Clamping Arm Robot

We hope you enjoy your Make: it Robotics Add-on Project Kit 2 from RadioShack.
Please read this user's guide before using your new robotics kit.

Contents

Getting Started

Using parts from the Make: it Robotics Starter Kit, Make: it Add-On Project Kit 1, and this Make: it Add-On Project Kit 2, you can build the following robots and program them using your Arduino Uno R3 (not included):

- **Street Sweeper Robot**: Clear a path with two rotating sweeper plates.
- **Catapult Robot**: Get it outta here! Position the robot and launch small objects.
- **Spotlight Robot**: Shed some light on the situation with and LED board that moves up, down, left, and right.
- **Clamping Arm Robot**: Pick it up and set it down with this grabbing robot.
- **Boxer Robot**: Move your opponent around the ring with powerful uppercuts.

Note: For an enhanced experience, plug in the IR sensor included in this kit, and control your robots with your home remote control (not included) or the Make: it Robotics Remote Control (not included).

Many online resources as well as books like *Make: Getting Started with Arduino* and *Make: Arduino Bots and Gadgets* (available at your local RadioShack store and RadioShack.com) can help you learn about Arduino programming.

Warning!

- Adult supervision and assistance are required.
- **CHOKING HAZARD —** This product contains small parts and functional sharp points on components. Keep away from children under age 3.
- Read and follow all instructions in the user's guide before use.
- Retain this user's guide for future reference.

Battery Notes

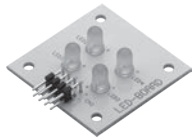
- Use only fresh batteries of the required size and type. Do not mix old and new batteries, different types of batteries (standard, alkaline, or rechargeable), or rechargeable batteries of different capacities.
- Dispose of batteries promptly and properly. Do not burn or bury them.
- If you do not plan to play with the robot for an extended period of time, remove the batteries.

Caution!

- The wires are not to be inserted into socket outlets.
- As an extra precaution, check this product regularly for signs of wear or damage.
- Ensure all wiring connections are correct before inserting batteries and switching on the product. Failure to do so may result in damage to components and the product.
- Ensure all wires are correctly connected to the battery terminals and other connectors. If the circuit does not work, make sure the plastic insulation of the wire is not obstructing the connection to the connector.
- When you have finished playing, remove the batteries and switch off the unit before you disconnect the wires. Do not apply any components or parts to the unit other than those provided with this kit.
- **To prevent overheating and damage, do not short-circuit the battery terminals and connectors. Do not block or cover the motor or other moving parts.**

Package Contents

This Make: it Robotics Add-On Project Kit 2 requires parts from the Make: it Robotics Starter Kit and the Make: it Robotics Add-On Project Kit 1.

Parts			
 Black Tip Motor	 Motor Plate	 13-Hole Bent-Angle Bar (3)	 7-Hole Right-Angle Bar
 Motor Adapter	 LED PCB	 Sweeper Plate (2)	 Connection Cable (4)
 Catapult Box	 Column B		
Screws and Nuts			
 M3 × 6 Screw (10)	 M3 × 28 Screw (2)	 M2 × 5 Screw (2)	 M3 Nut (12)

Required Tools

- No. 1 Phillips crosspoint screwdriver
- No. 2 Phillips crosspoint screwdriver

Required Accessories

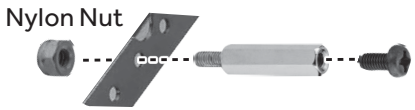
- Clear tape
- AA batteries (8)
- Arduino Uno R3 board
- USB cable (type A connector to type B connector)

Note:

- Gather all the necessary components before you begin building your robot.
- You can build only one robot at a time.

Helpful Hints

- For screw and nut connections at 90° from each other, partially tighten each screw before fully tightening both.
- When installing columns into nylon nuts, insert an M3 × 6 screw into the end of the column and screw tight into the nylon nut. Hold the column with an adjustable wrench (not included) and unscrew the M3 × 6 screw from the column.



Clamping Arm Robot

1

(2)

(2)

M3 × 6 (4)

M3 (4)

2

(2)

M3 × 6 (4)

M3 (4)

3

(2)

M3 × 6 (4)

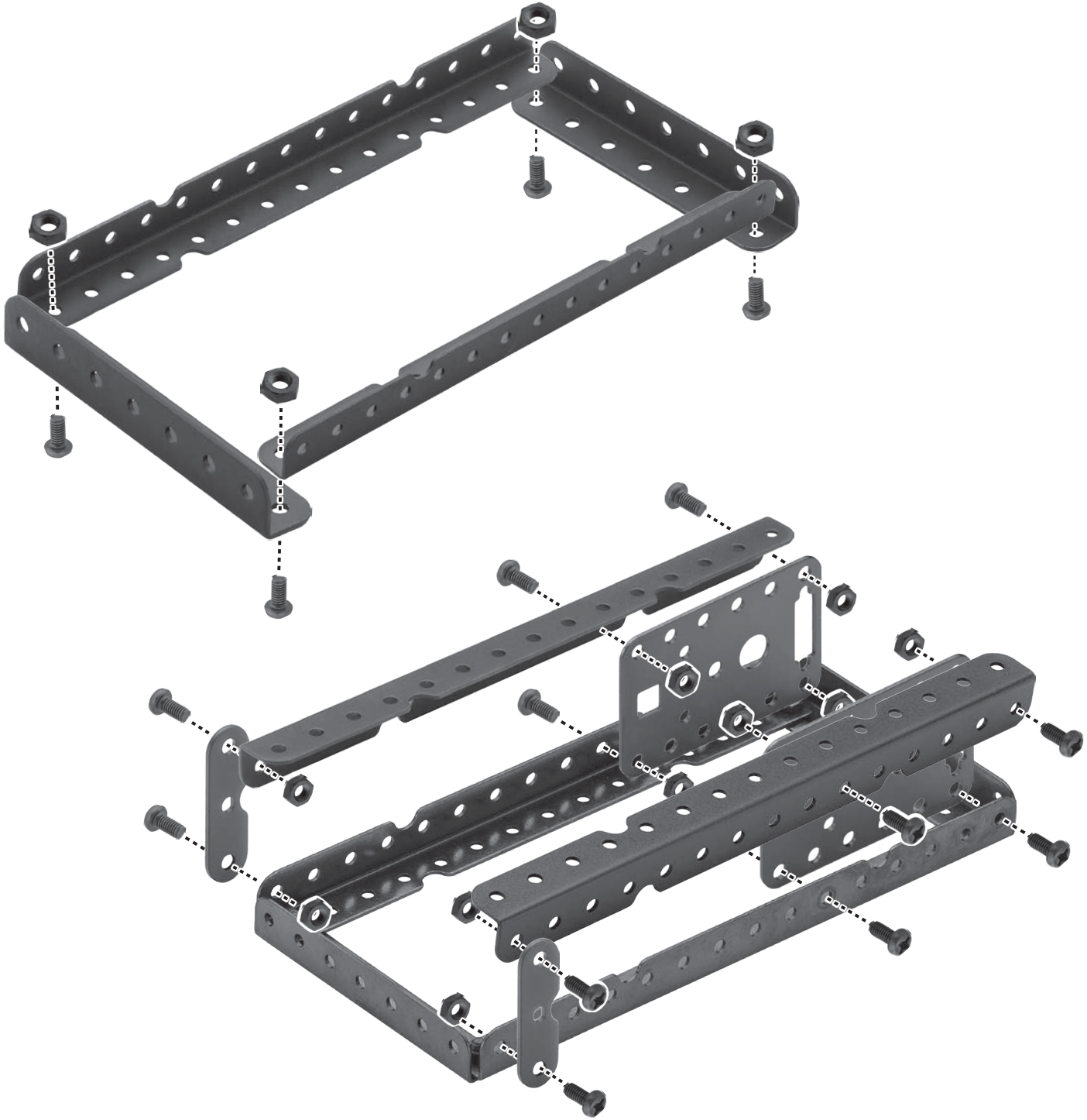
M3 (4)

4

(2)

M3 × 6 (4)

M3 (4)



Clamping Arm Robot

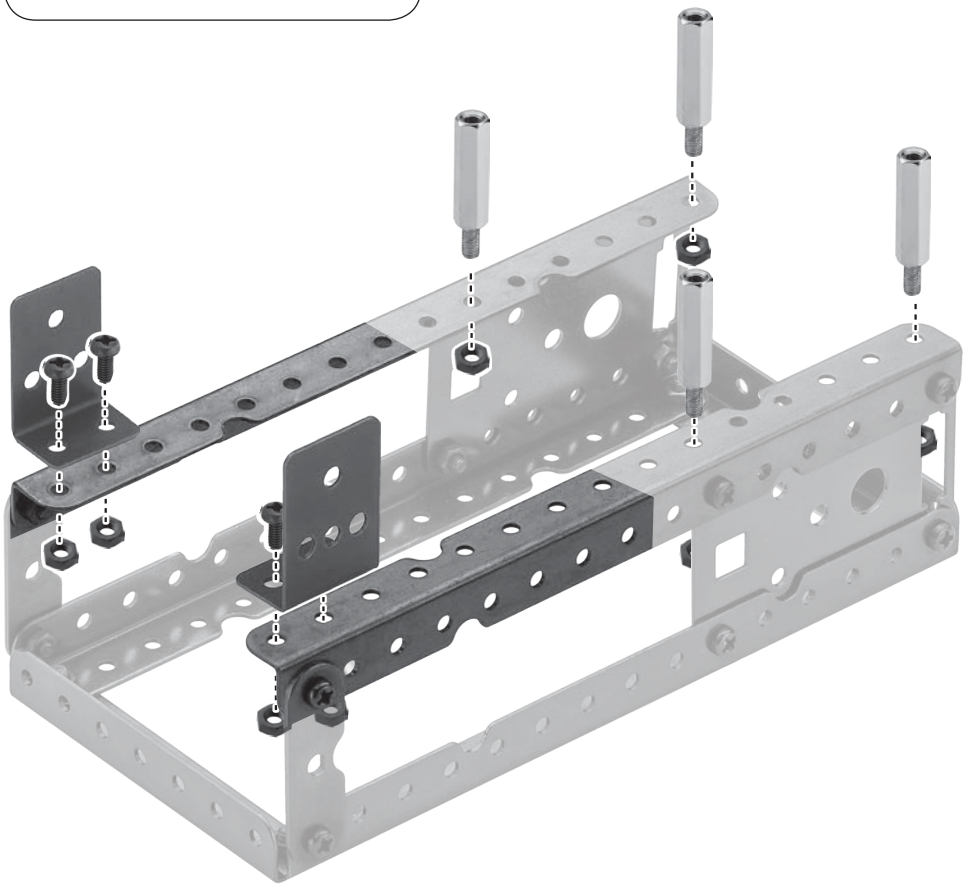
5


(2)


Column A (4)


M3 × 6 (4)


M3 (8)

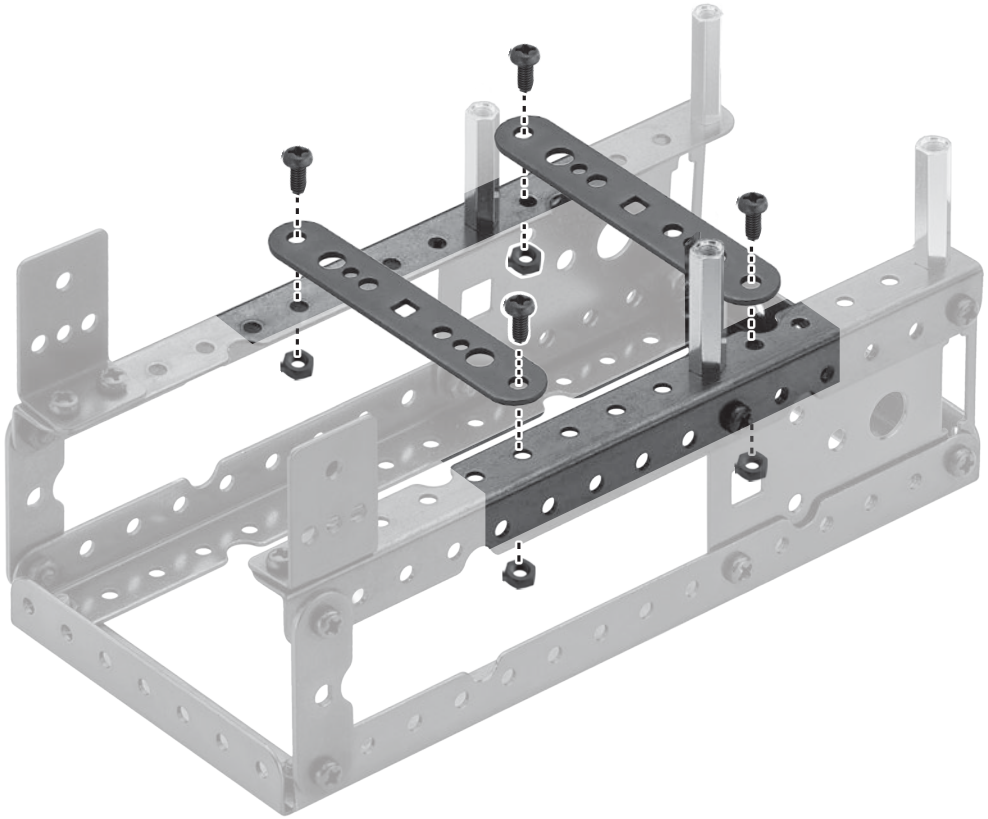


6


(2)


M3 × 6 (4)


M3 (4)

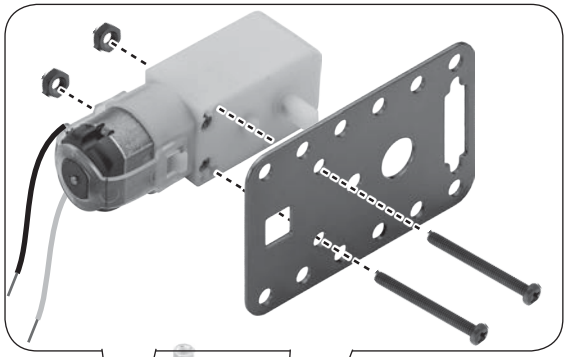


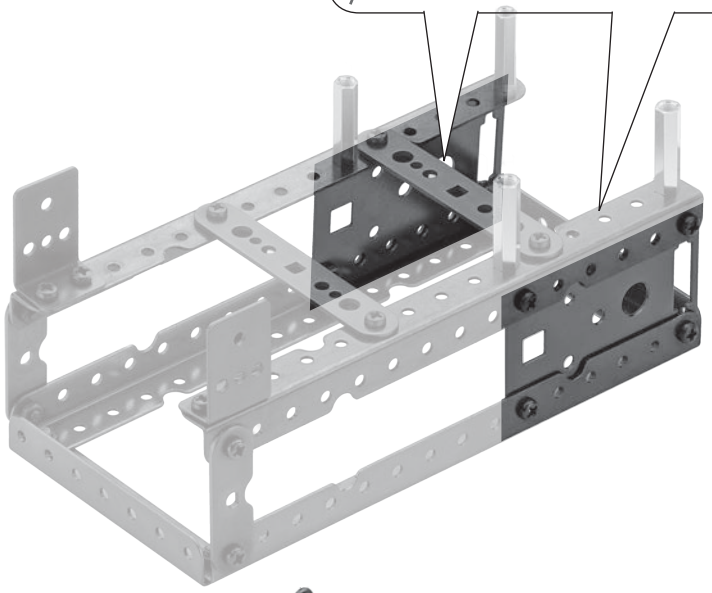
7

Black Tip (2)

M3 × 28 (4)

M3 (4)





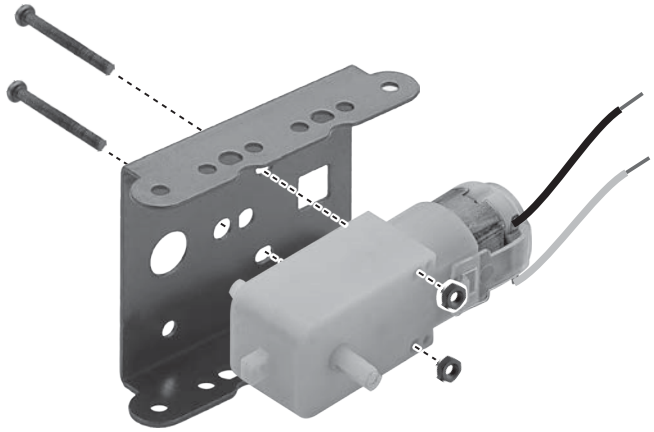
8

White Tip (1)

(1)

M3 × 28 (2)

M3 (2)

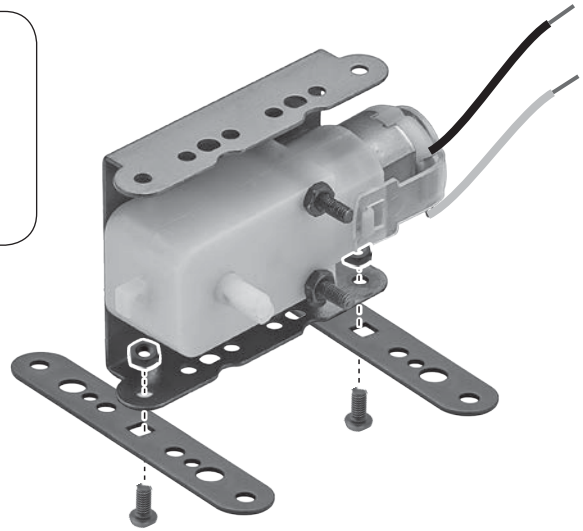


9

(2)

M3 × 6 (2)

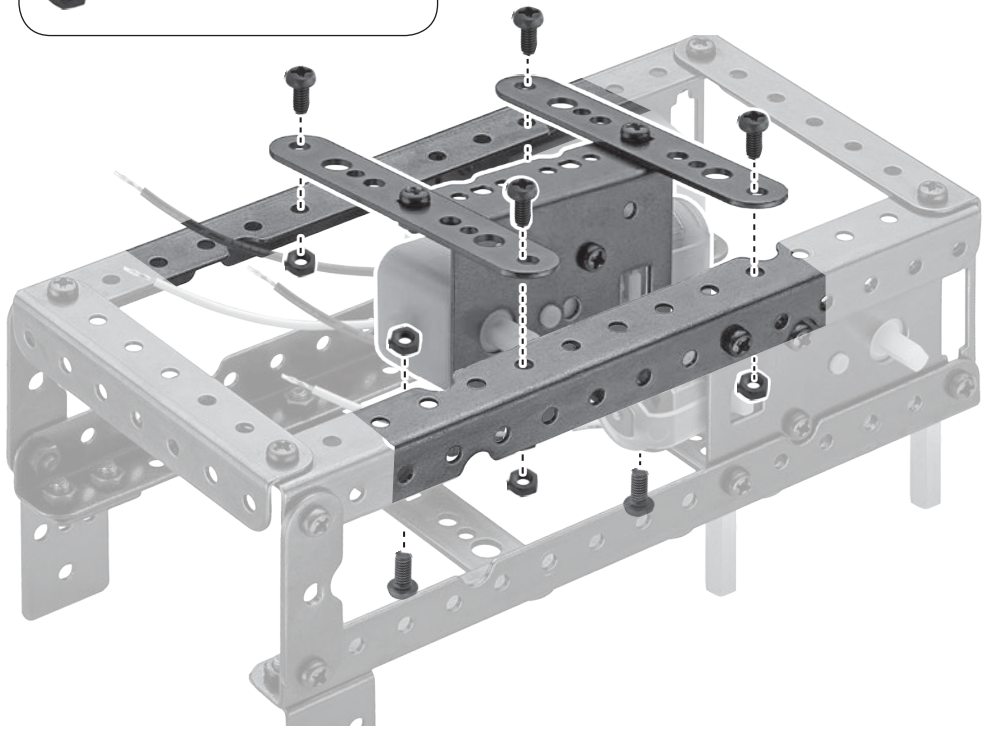
M3 (2)



10

M3 × 6 (6)

M3 (6)

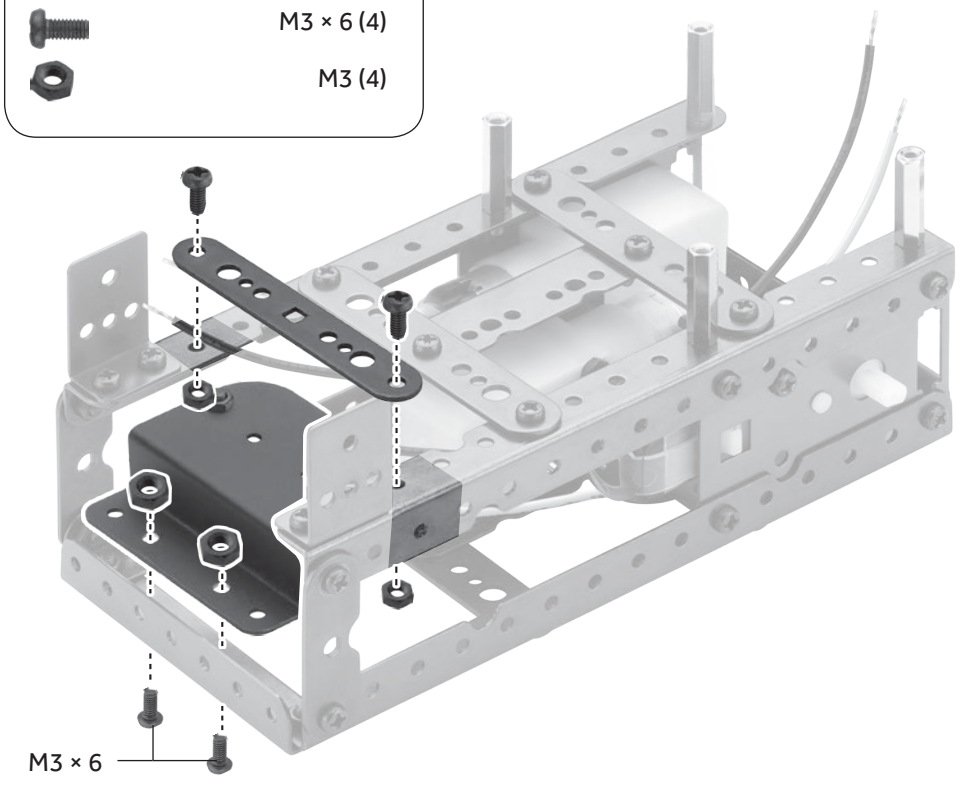


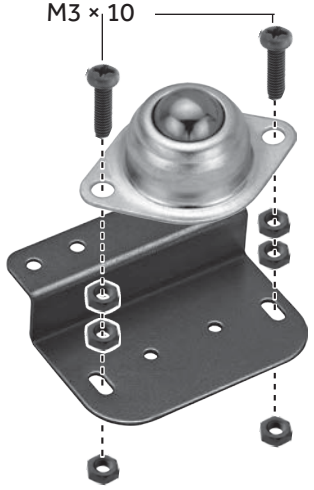
11

(1)

M3 × 6 (4)

M3 (4)





12

(1)

(1)

M3 × 10 (2)

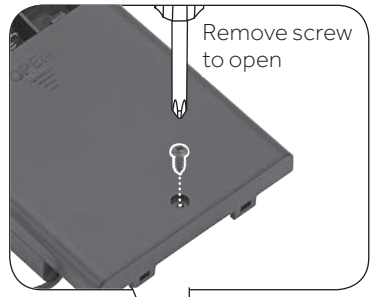
M3 (6)

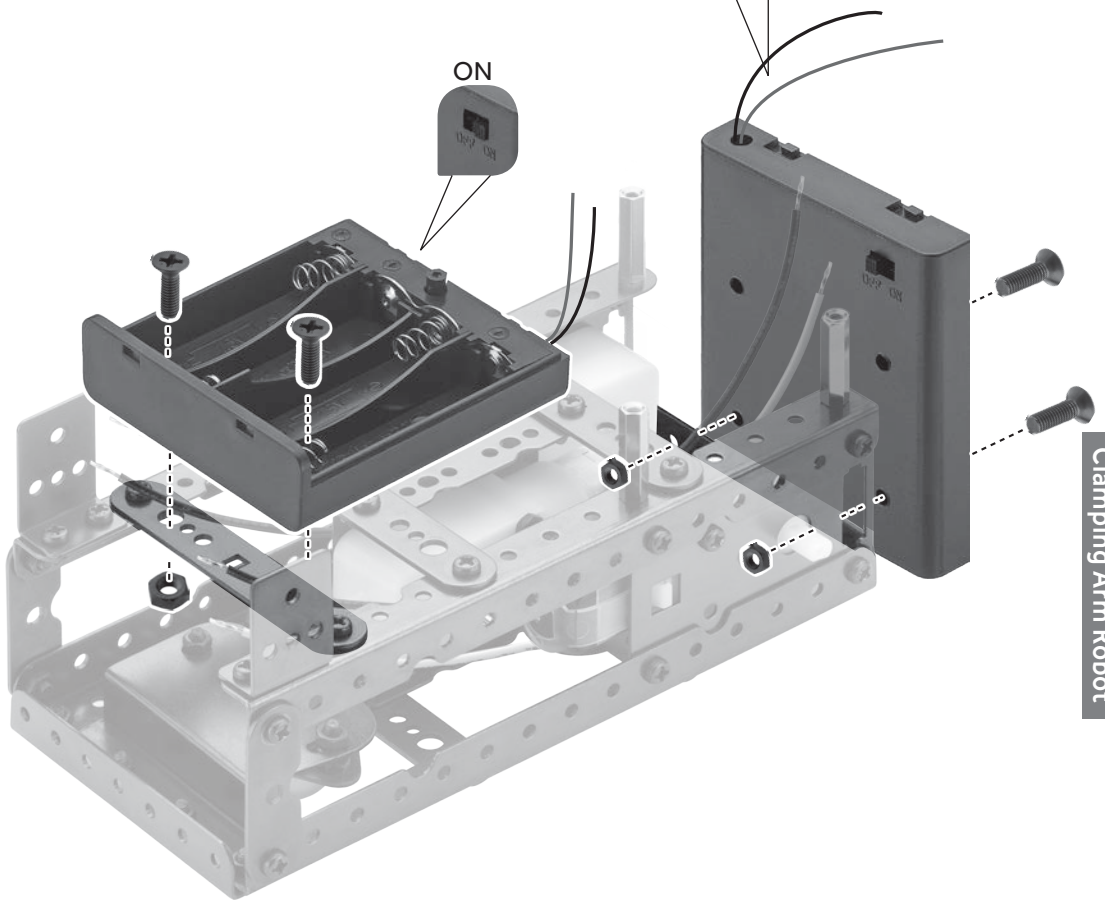
13

(2)

M3 × 10 Flat (4)

M3 (4)





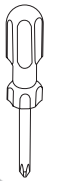
14


(2)


Column A (2)


M2 × 5 (2)


M3 Nylon (2)


No. 1 Phillips crosspoint screwdriver

***Note**: To ensure correct positioning, attach the shaft connectors so that the flat part of the threads of one connector is 180° from the flat part of the threads of the other connector.*

15


(2)

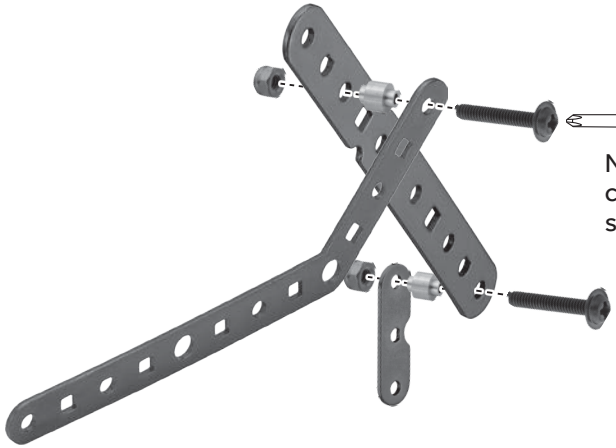

(4)

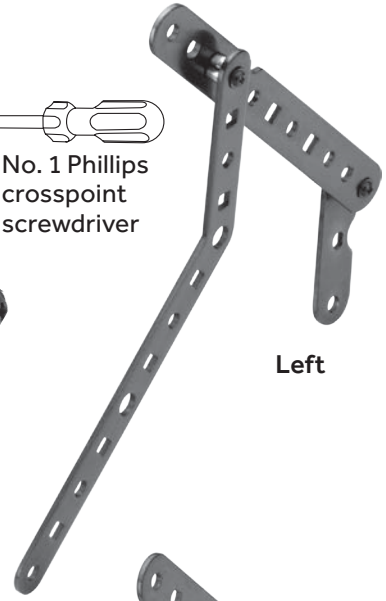

(2)

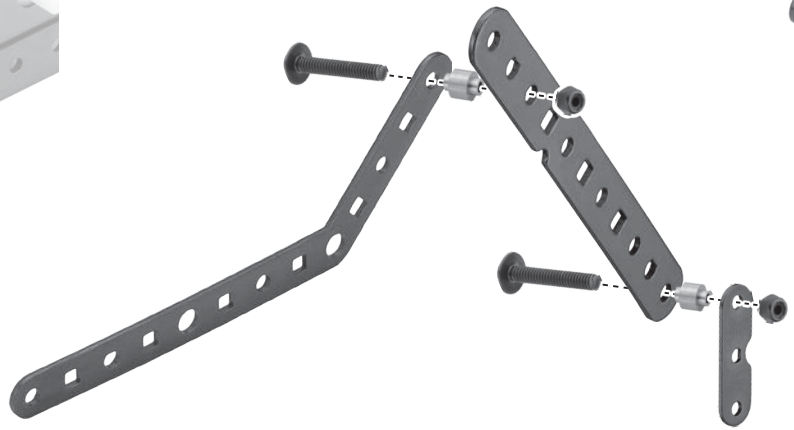

M2 × 12 Washer (4)

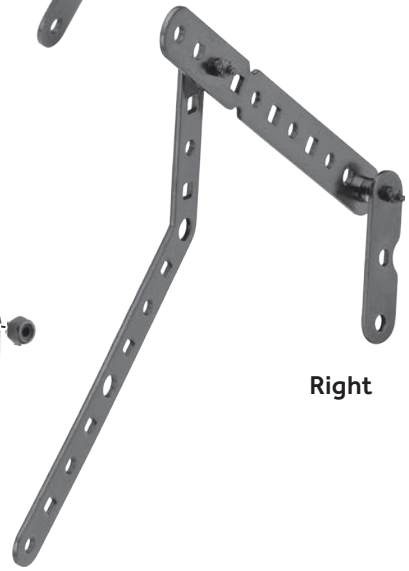

(2)


M2 Nylon (4)







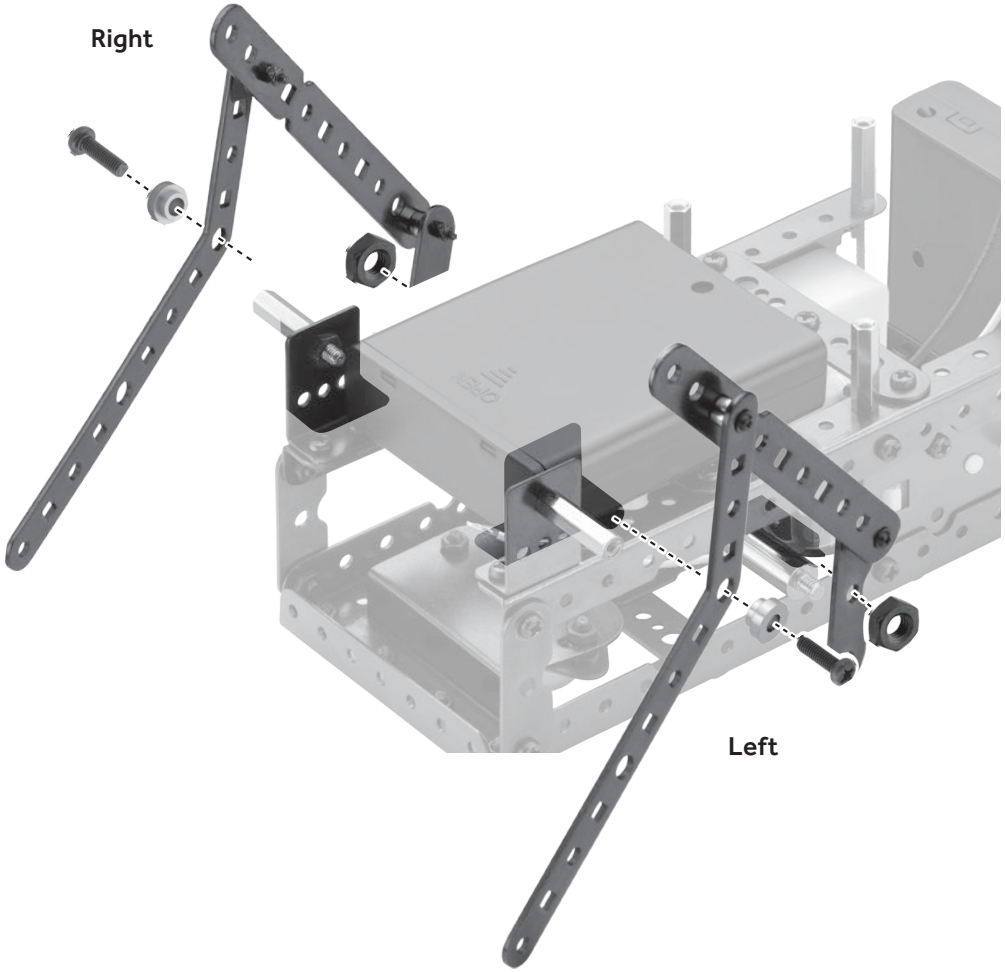


16


(2)


M3 × 10 (2)


M4 (2)



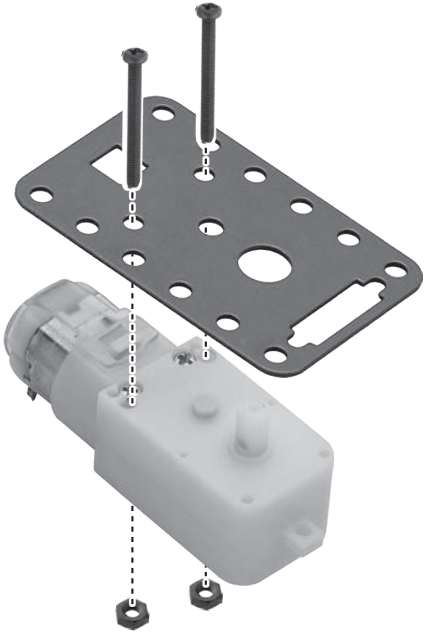
17


White Tip (1)


(1)


M3 × 28 (2)


M3 (2)



18


(2)

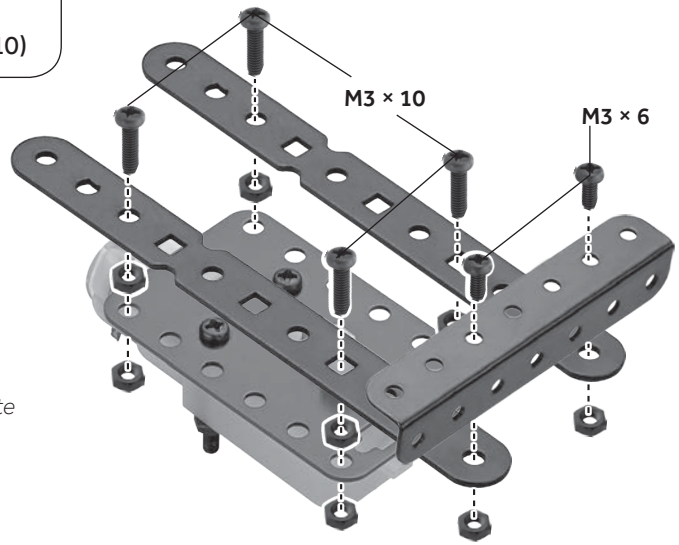

(1)


M3 × 6 (2)


M3 × 10 (4)


M3 (10)

***Note**: Only partially tighten the nuts in this step. You will fully tighten them after you complete the rest of the clamp assembly.*



19

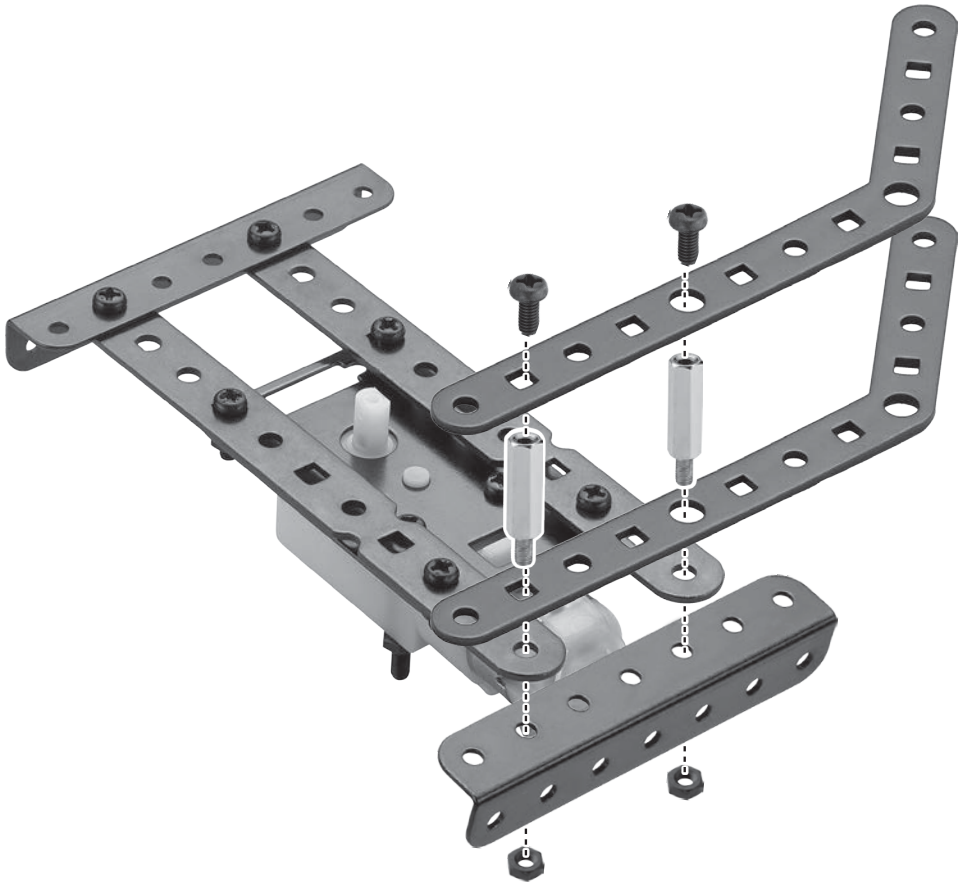

(2)


(1)


Column B (4)


M3 × 6 (2)

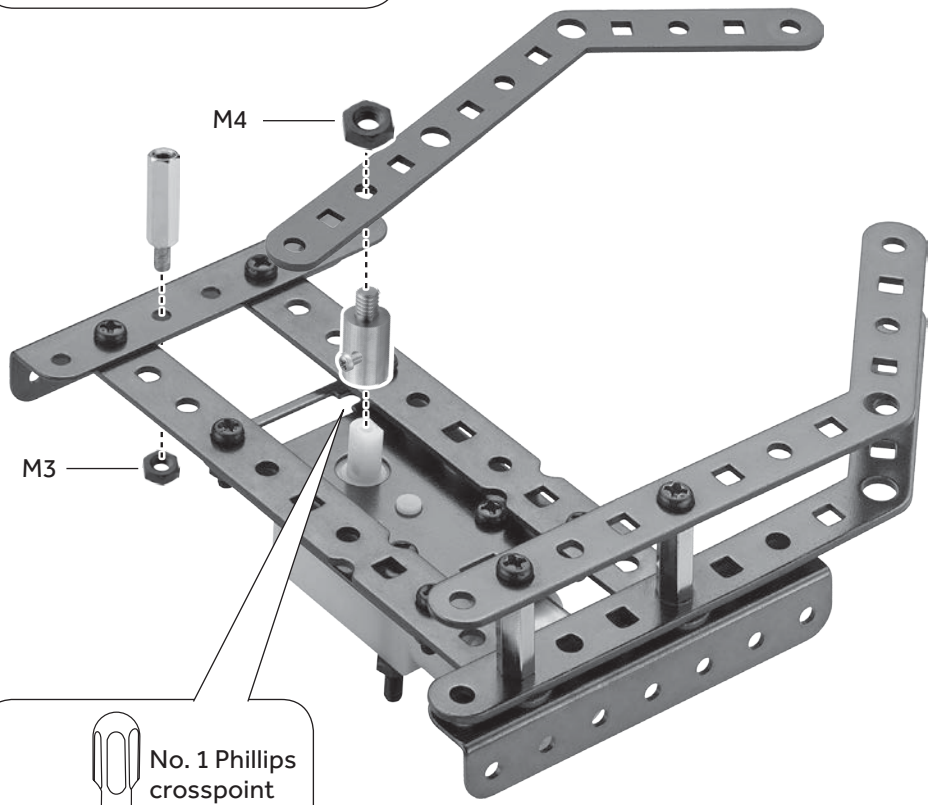

M3 (2)

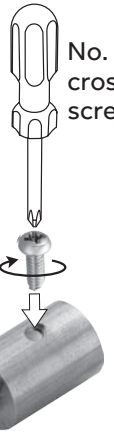


20


Column B (4)


M3 (1)




No. 1 Phillips crosspoint screwdriver

21


(1)


(1)


M2 ×5 (1)


M4 (1)

22

M3 × 6 (4)

M3 (4)

Note: *Tighten all screws on the clamp assembly before moving to Step 23.*

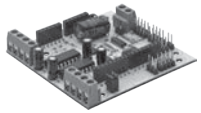
23

(2)

24

Column B (4)

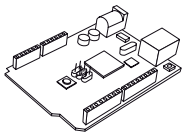
25

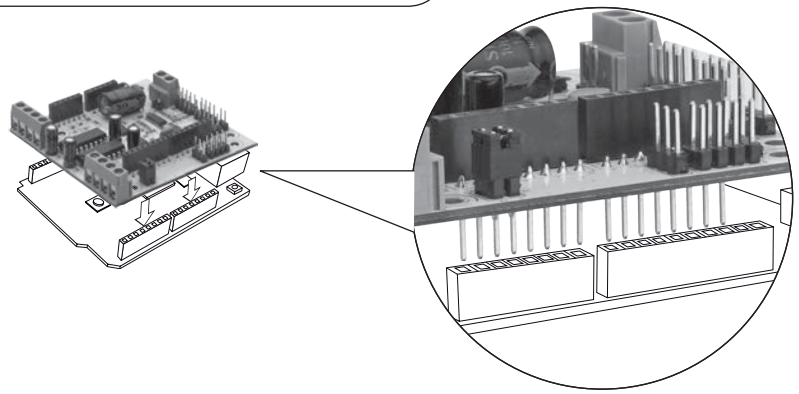


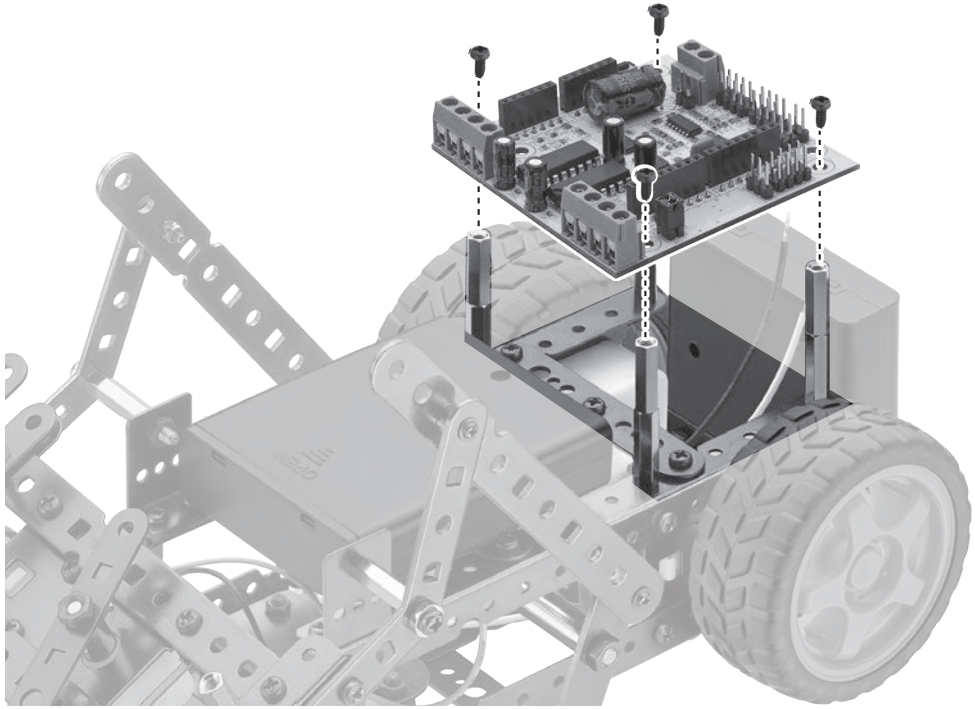
(1)

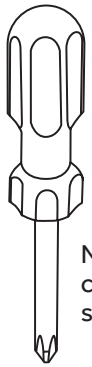
M3 × 6 (4)

Not Included:
Arduino Uno R3 (1)



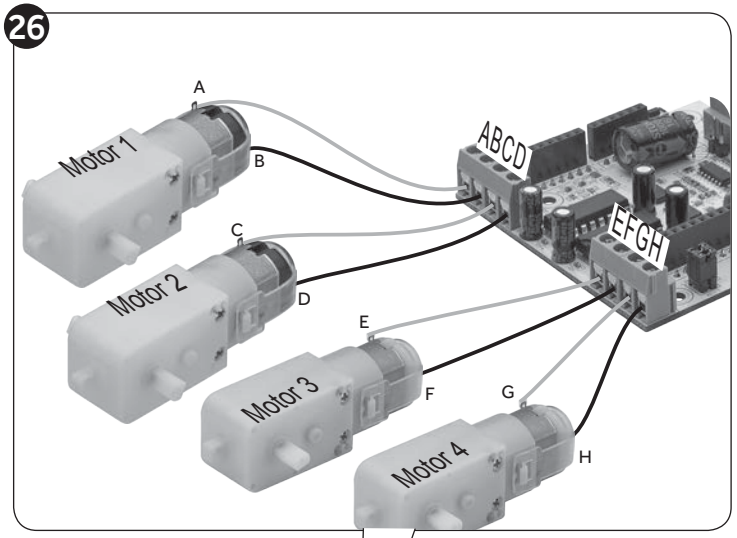




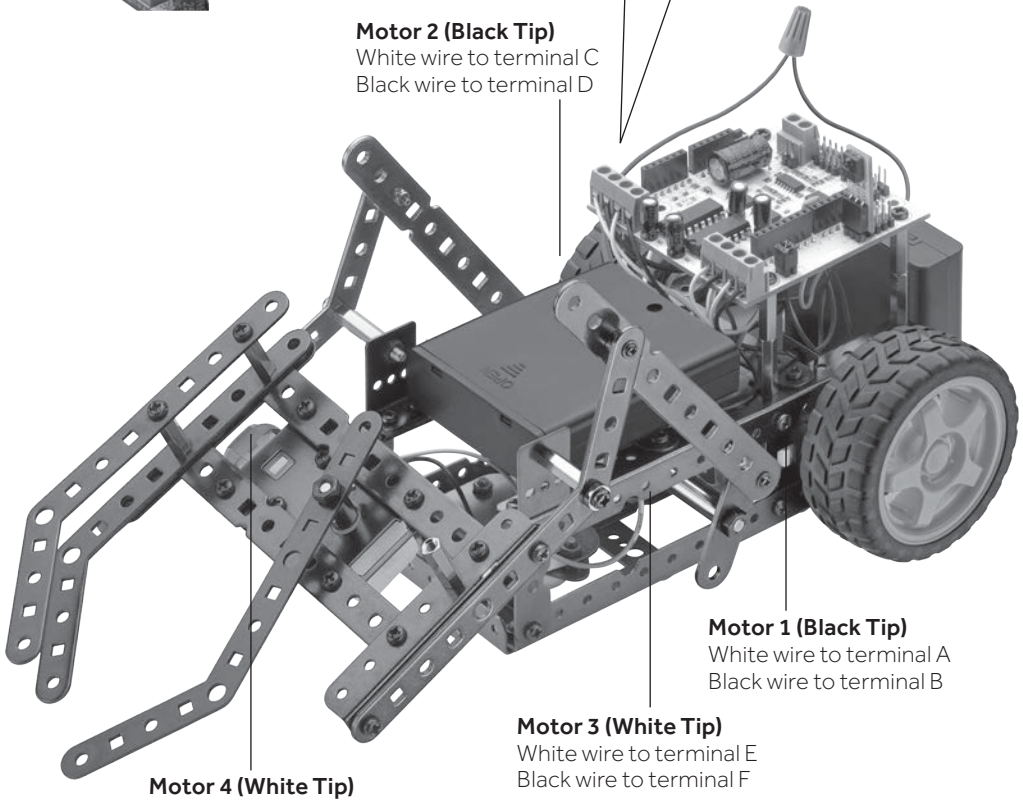


No. 1 Phillips
crosspoint
screwdriver

26



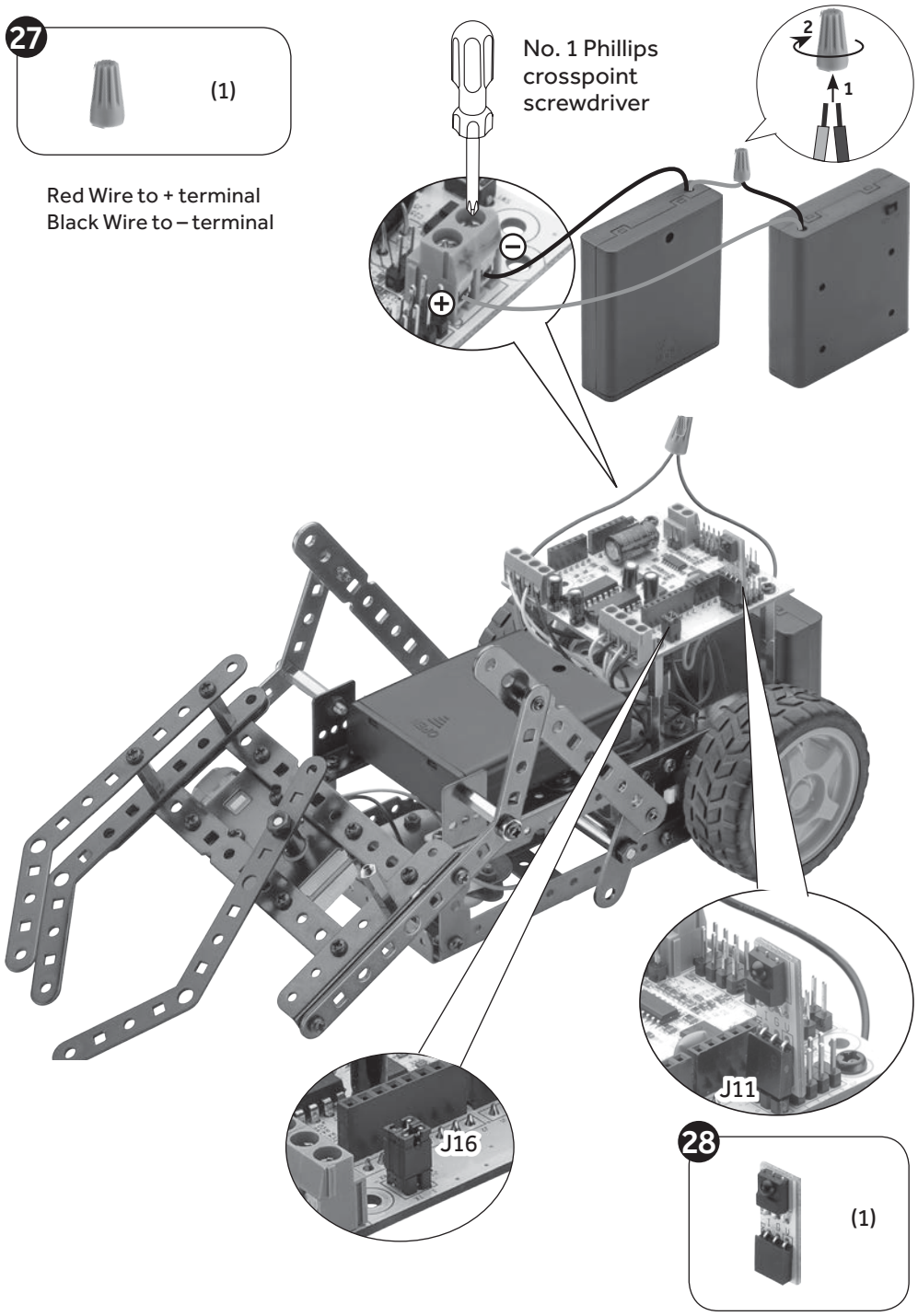
Motor 2 (Black Tip)
White wire to terminal C
Black wire to terminal D



Motor 1 (Black Tip)
White wire to terminal A
Black wire to terminal B

Motor 3 (White Tip)
White wire to terminal E
Black wire to terminal F

Motor 4 (White Tip)
White wire to terminal G
Black wire to terminal H

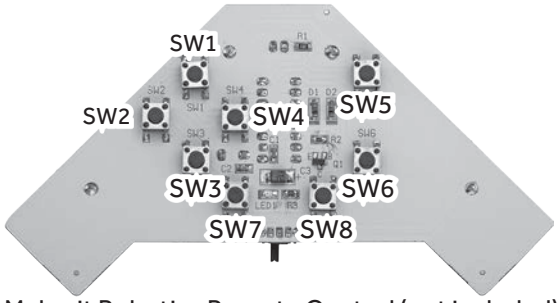


Download the Support Files

1. For the Arduino program and libraries, go to http://shack.net/MakeItRobotics.
2. At the end of the blog post, click **Make: it Robotics Add-On Project Kit 2 Support Files** and save the folder to your computer.
3. If you have not created a directory in your Arduino folder for the Make: it Robotics programs, open READ_ME.txt and follow the directions.
4. Connect your Arduino Uno R3 to your computer with a USB cable.
5. Remove the jumpers from J16 on the PCB to allow your Arduino's USB port to communicate with your computer.
6. Open one of the .ino file in the Arduino programming environment.
   - **Clampingarm_demo.ino** automatically cycles through each motor function.
   - **Clampingarm_home_remote.ino** cycles through each motor function when you press any key on any IR remote control you have in your home.
   - **Clampingarm_IR_remote.ino** allows you to control your robot using the Make: it Robotics Kit Remote Control.
7. Verify and upload the program to your Arduino Uno R3.
8. Remove the USB cable from your Arduino Uno R3.
9. Put the jumpers back onto J16. When the PCB is connected to your Arduino and the jumpers on J16 are in place, your Arduino's serial port will be unavailable.

Play

1. Install batteries into both battery compartments, matching the polarities marked inside. Replace the cover and screw.
2. Slide the power switches to ON on both battery compartments.
3. Experiment! Try editing the demo program so that your robot performs functions in a different order.



Make: it Robotics Remote Control (not included)

Button	Function
SW1	Forward
SW2	Turn left
SW3	Backward
SW4	Turn right
SW5	-
SW6	-
SW7	Clamp and hold
SW8	Release clamp
SW5+SW1	Move clamp up
SW5+SW3	Move clamp down
SW6+SW1	Open clamp
SW6+SW3	Close clamp

FCC Information

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Limited Warranty

RadioShack warrants this product against defects in materials and workmanship under normal use by the original purchaser for **ninety (90) days** after the date of purchase from a RadioShack-owned store or an authorized RadioShack franchisee or dealer. RADIOSHACK MAKES NO OTHER EXPRESS WARRANTIES.

This warranty does not cover: (a) damage or failure caused by or attributable to abuse, misuse, failure to follow instructions, improper installation or maintenance, alteration, accident, Acts of God (such as floods or lightning), or excess voltage or current; (b) improper or incorrectly performed repairs by persons who are not a RadioShack Authorized Service Facility; (c) consumables such as fuses or batteries; (d) ordinary wear and tear or cosmetic damage; (e) transportation, shipping or insurance costs; (f) costs of product removal, installation, set-up service, adjustment or reinstallation; and (g) claims by persons other than the original purchaser.

Should a problem occur that is covered by this warranty, take the product and the RadioShack sales receipt as proof of purchase date to any RadioShack store in the U.S. RadioShack will, at its option, unless otherwise provided by law (a) replace the product with the same or a comparable product, or (b) refund the purchase price. All replaced products, and products on which a refund is made, become the property of RadioShack.

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www.RadioShack.com

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