# Microbit Robotics Advanced Level 3

# Lesson 5

# Skip Car

Presented by Advanced Superlogic Team


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# Today's Topic

1. Build a Skip Car
2. Program the remote controller for the Skip Car
3. Skip Car movement tuning
4. Program eject function for the skip car


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# Learning Outcome

1. Able to build a skip car with the instruction
2. Able to program the remote controller and the skip car's movements and actions
3. Able to tune the movement for your skip car
4. Able to modify your design for loading and ejecting the bricks.


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# What we did in previous lesson


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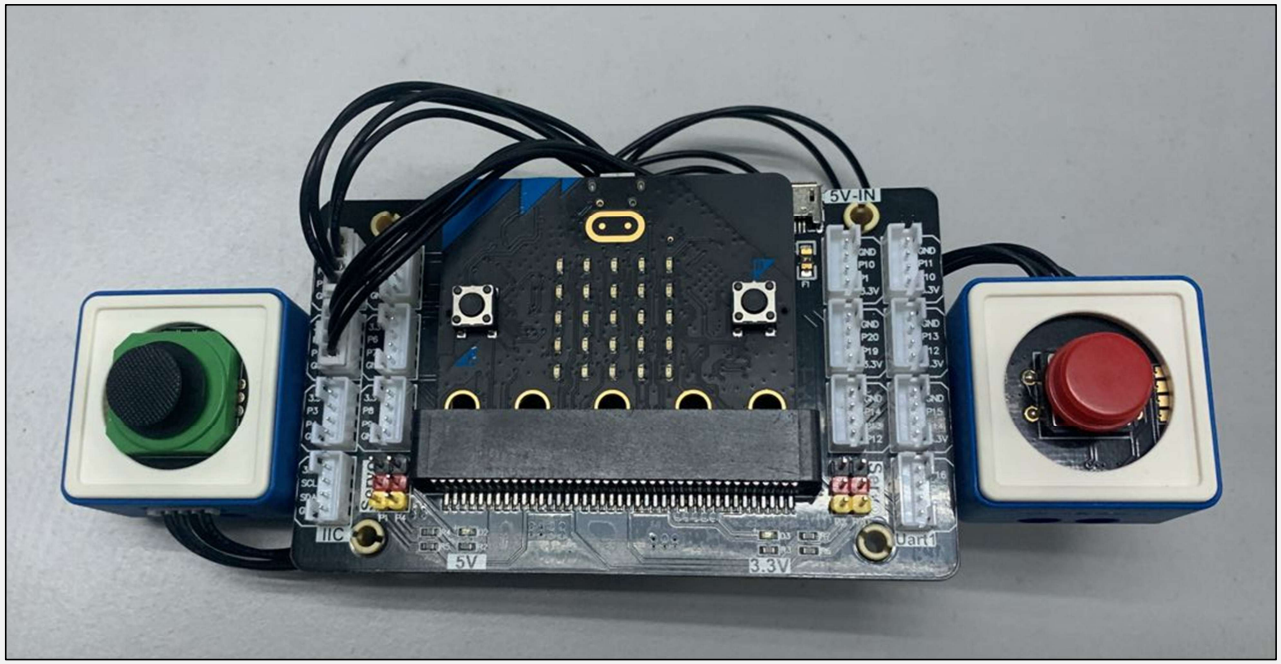
# WOM Controller Setup

**Rocker Module:**

Movement Control




**Button Module:**

Grab & Release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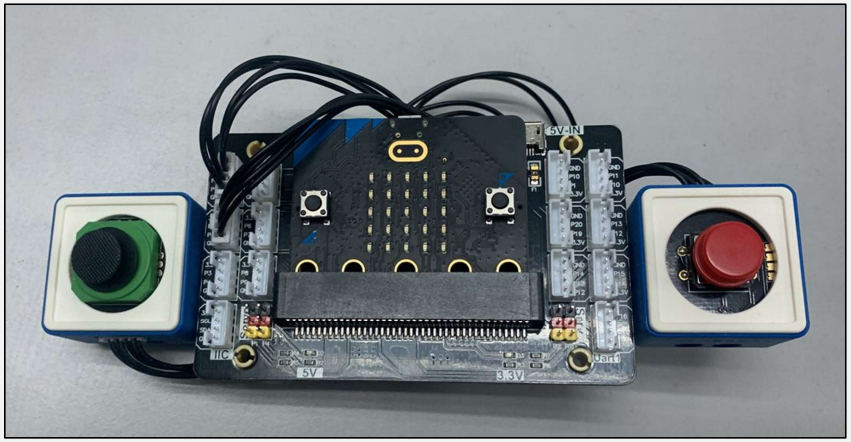
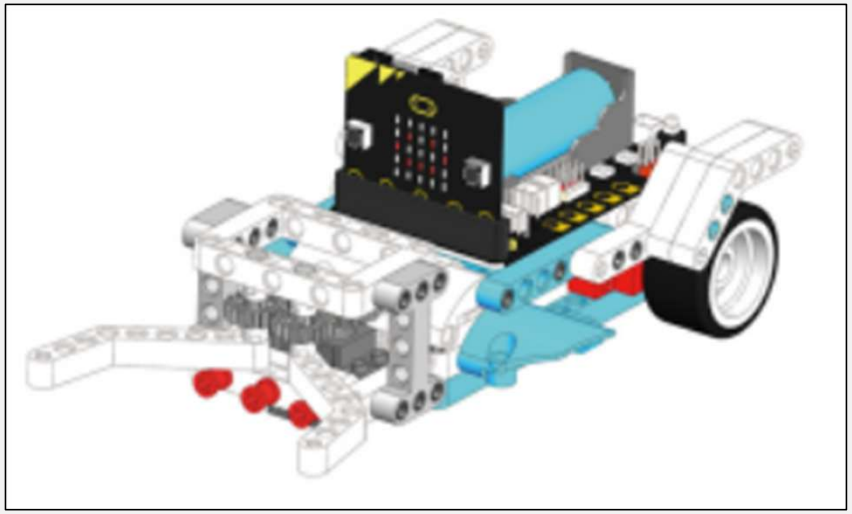
# Test the remote control



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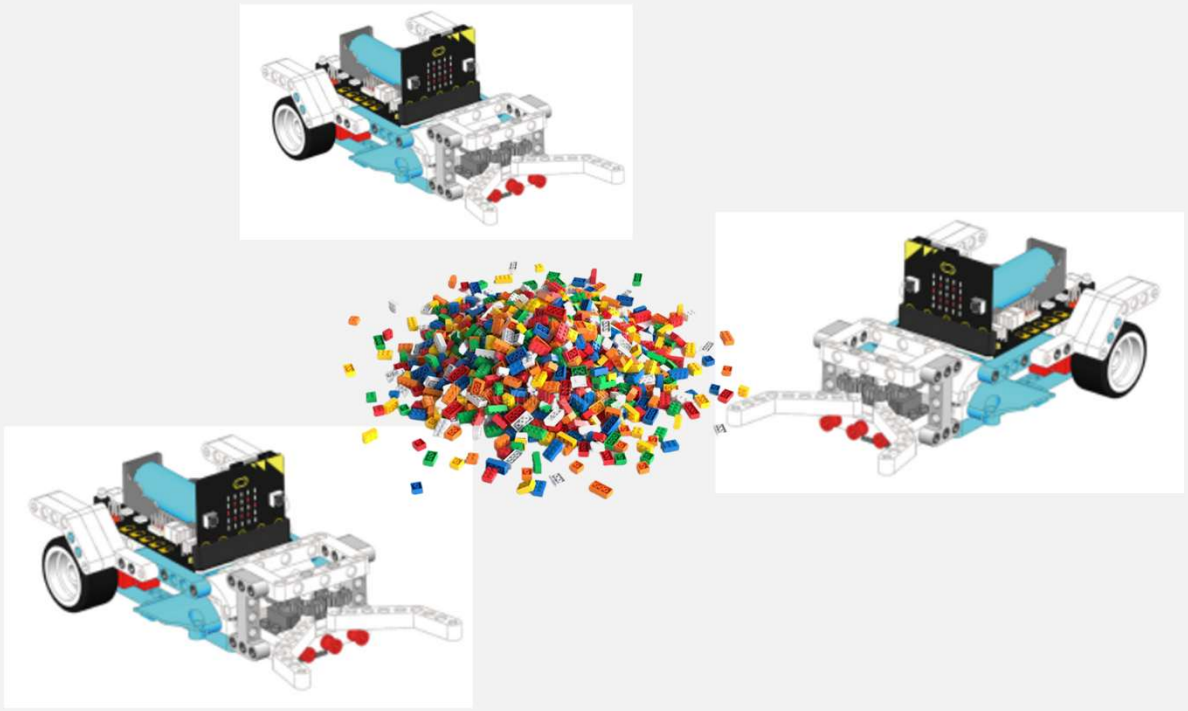
# Brick War Mini Competition

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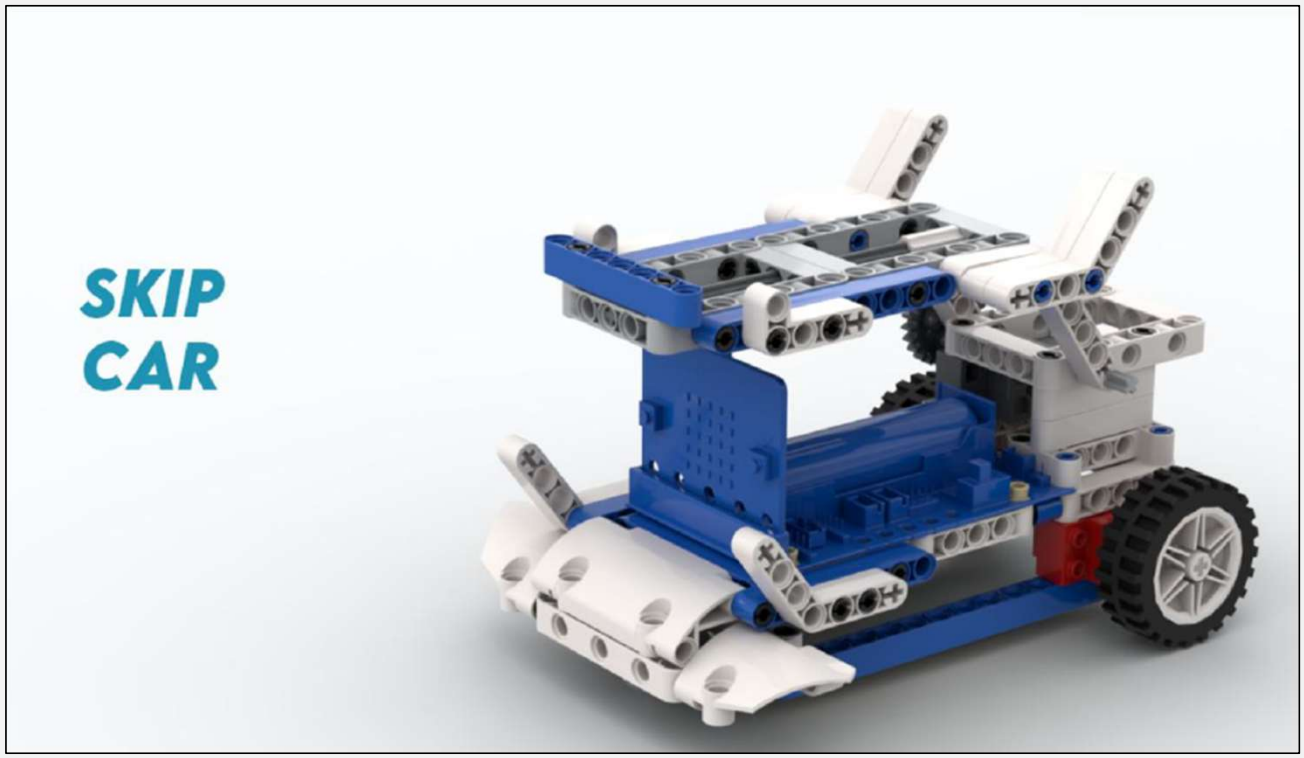
# Build a Skip Car





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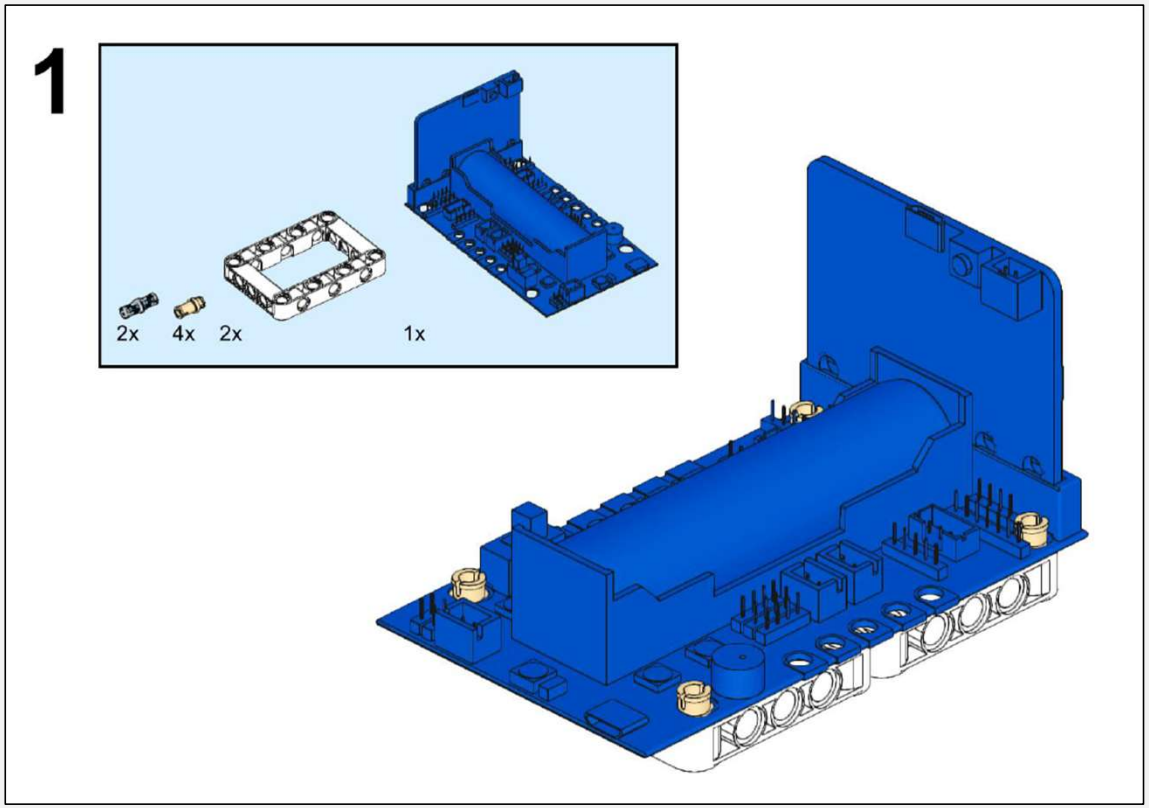



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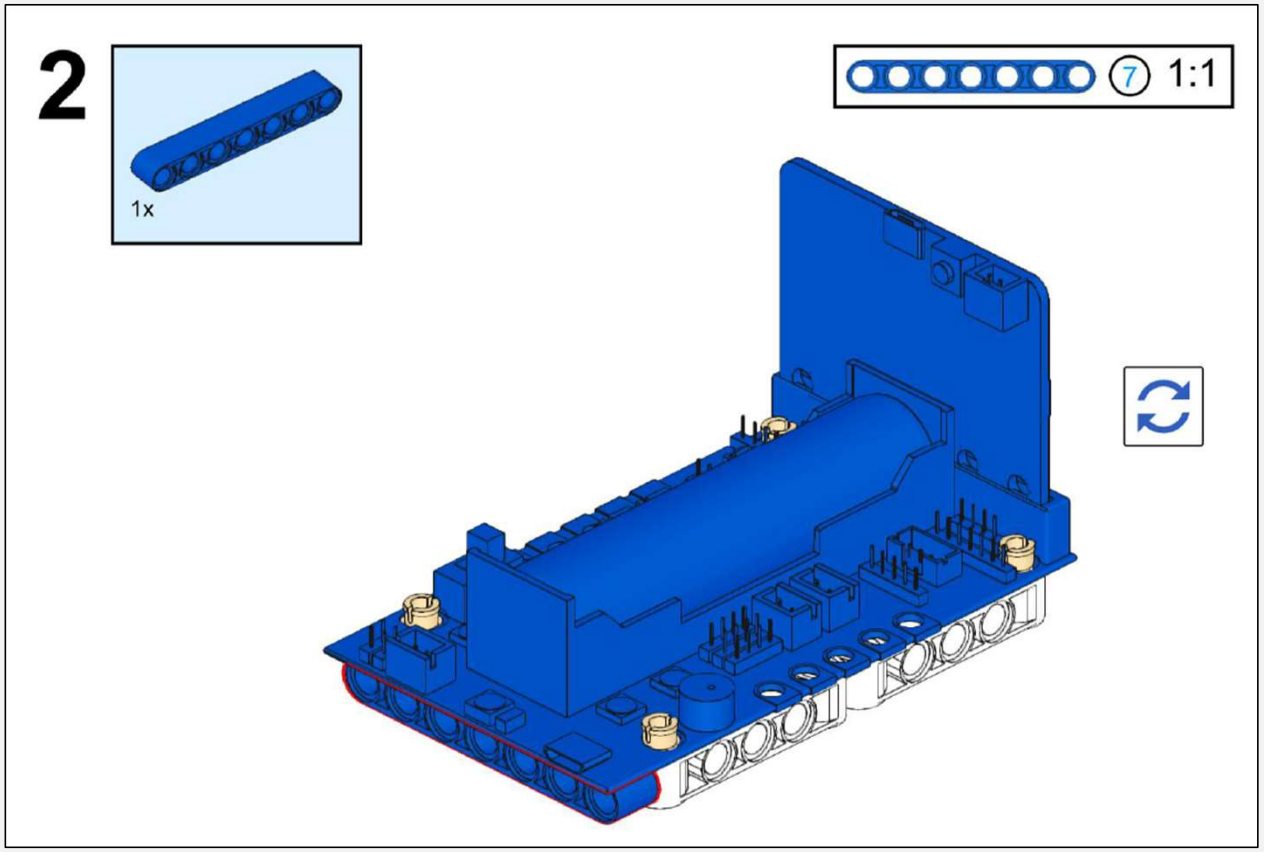



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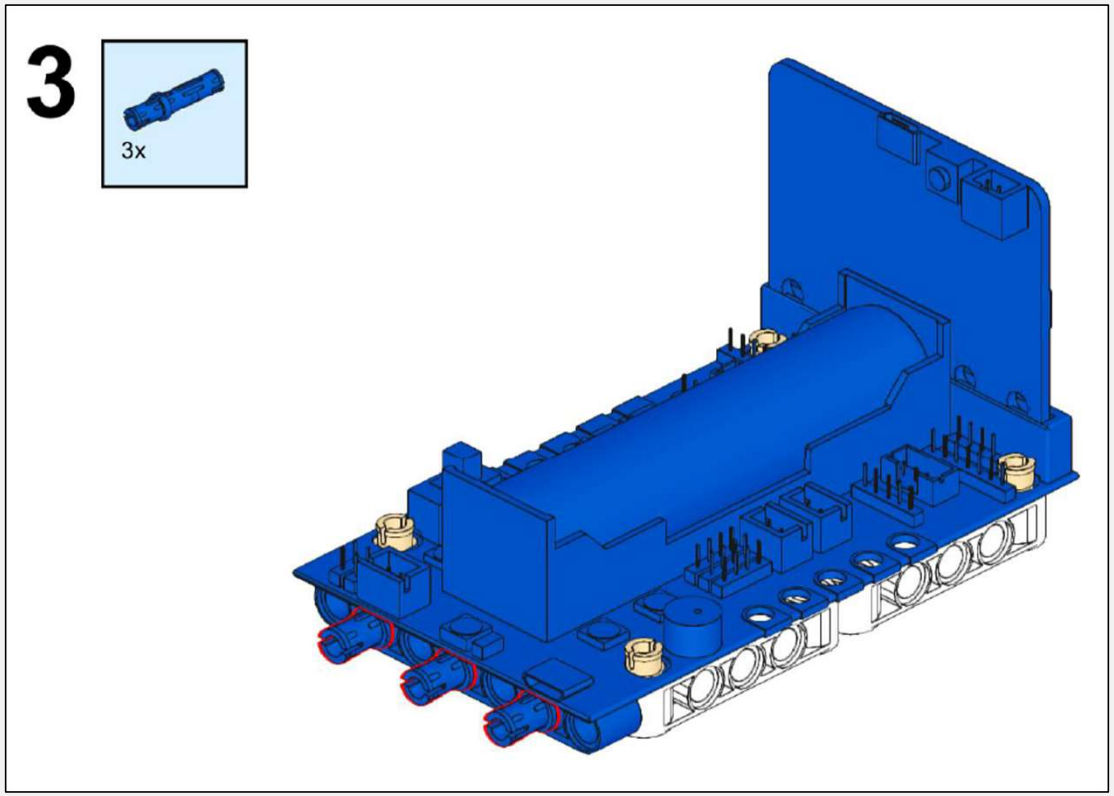



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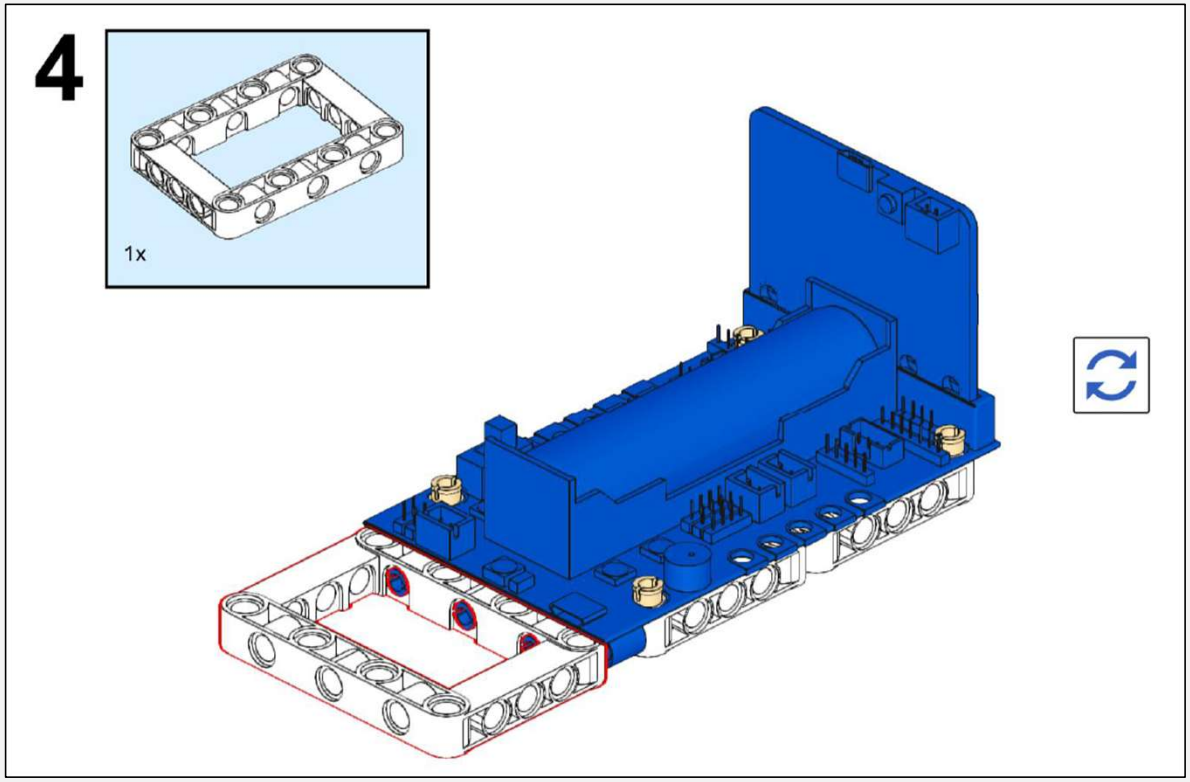



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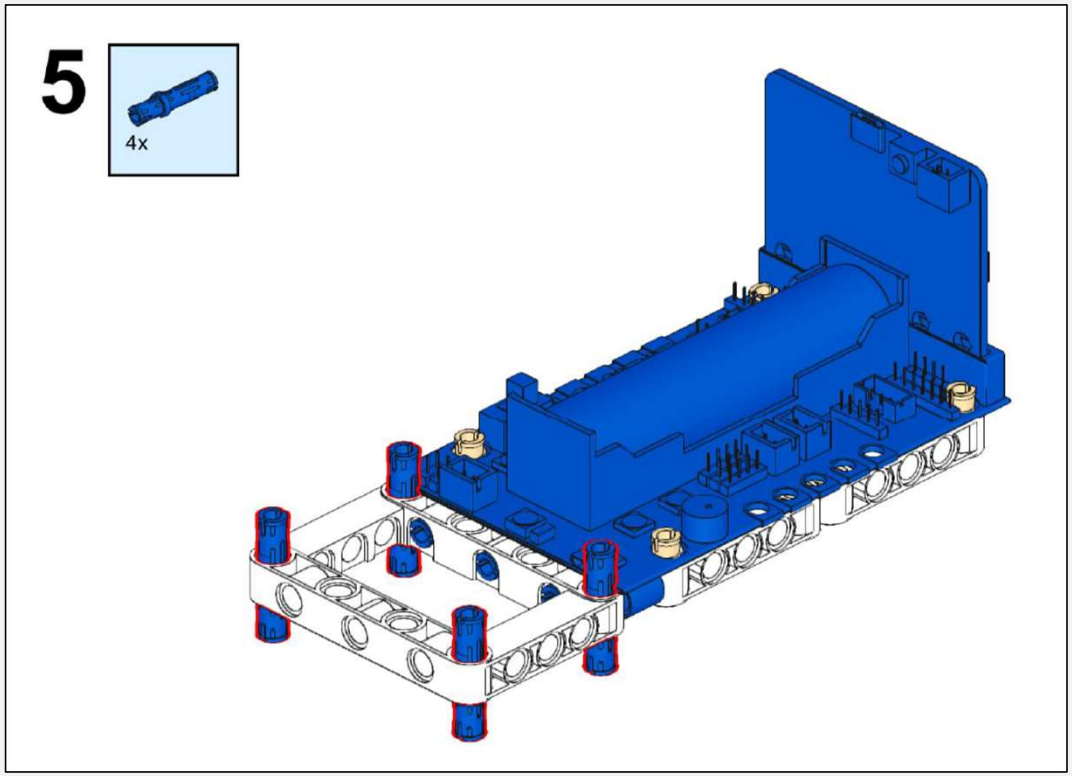



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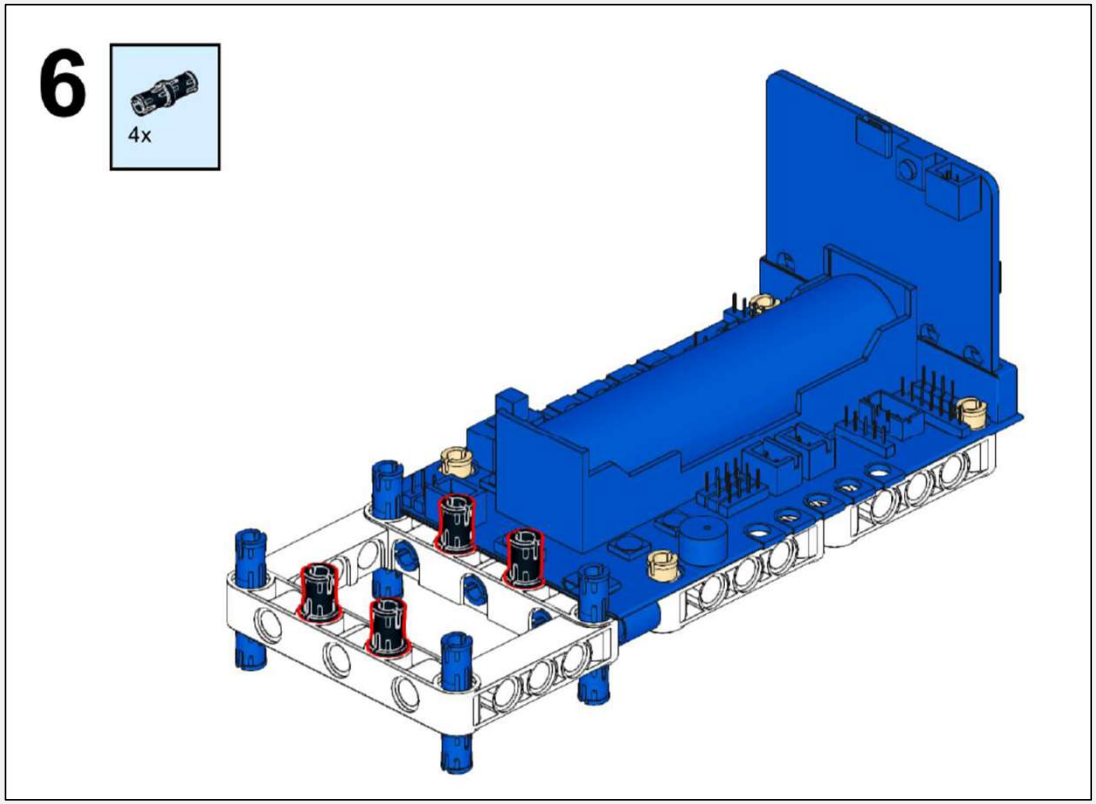



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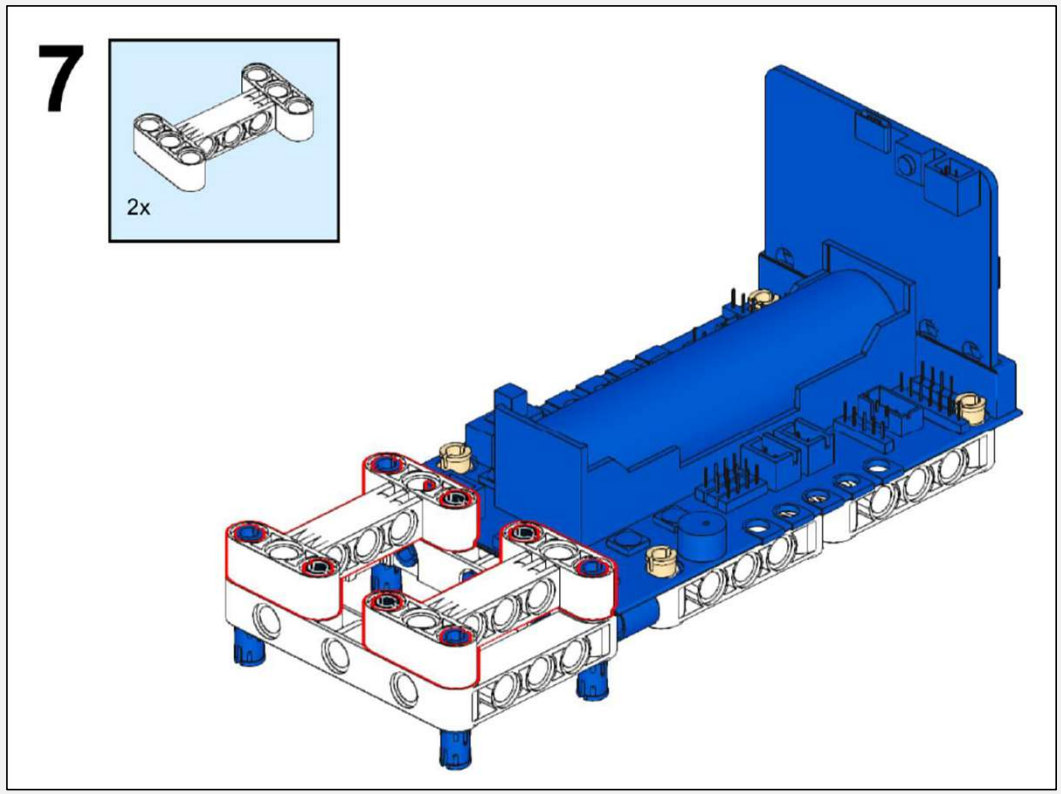



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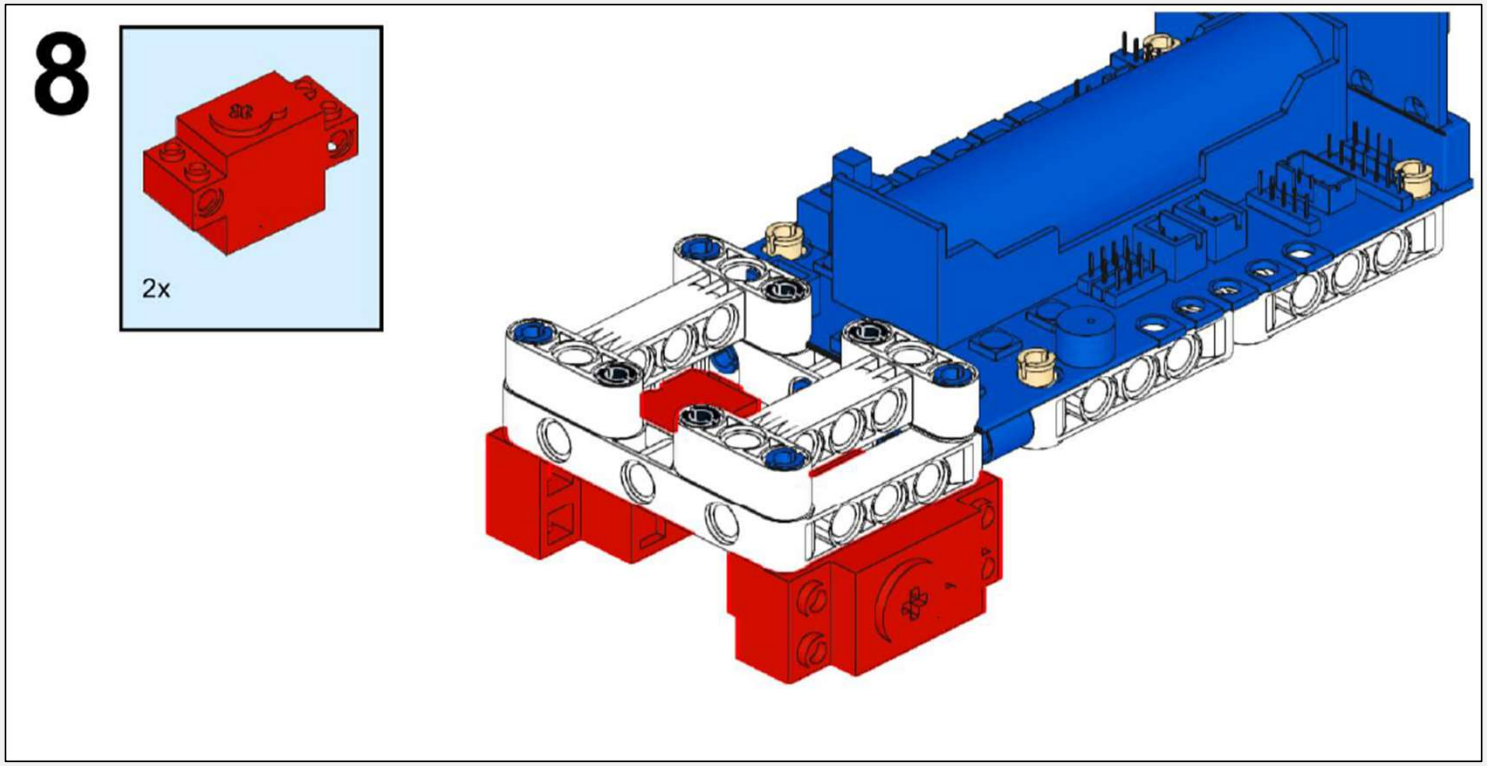



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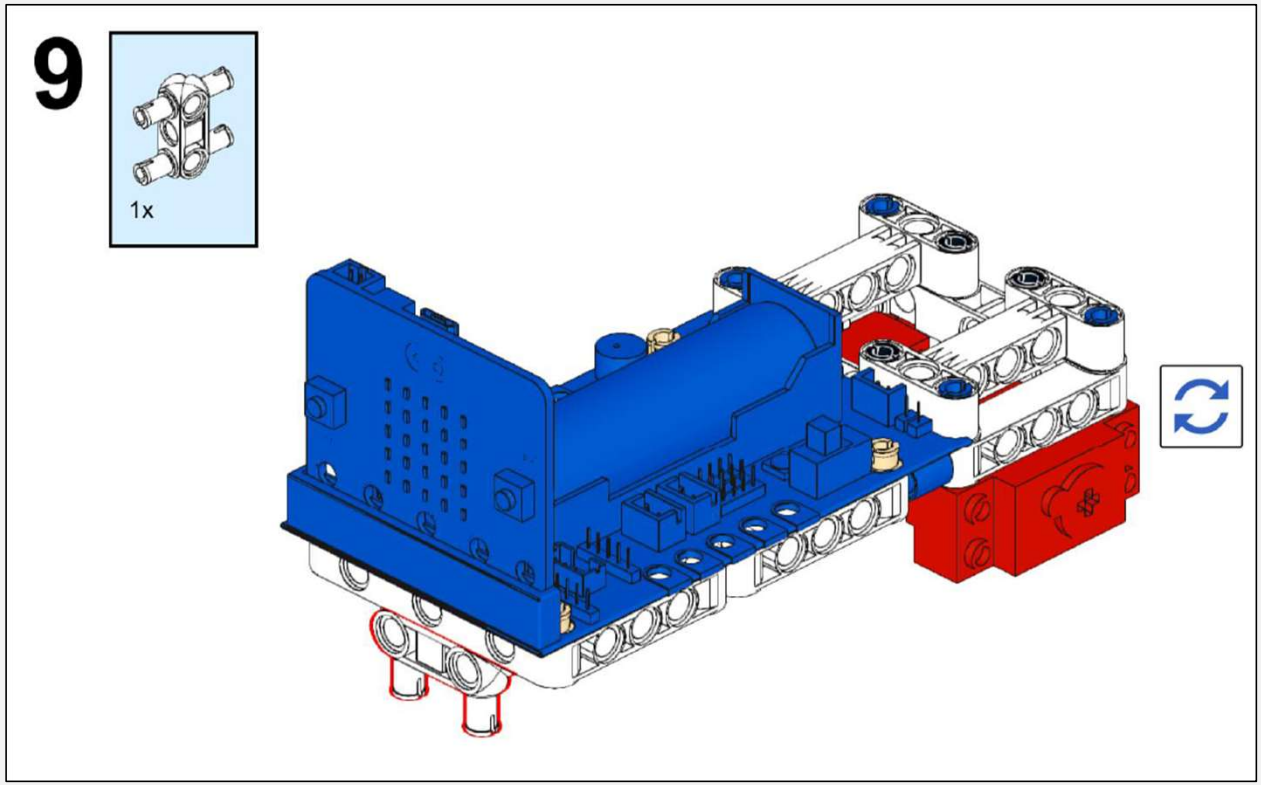



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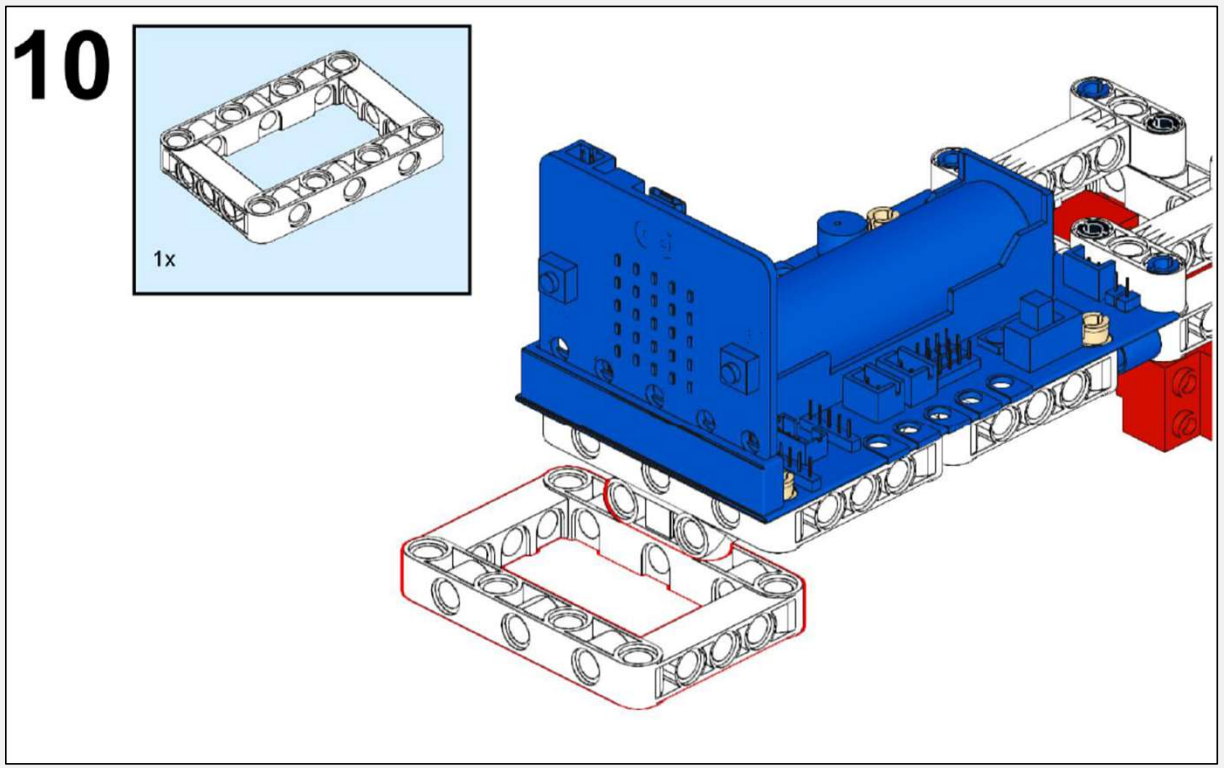



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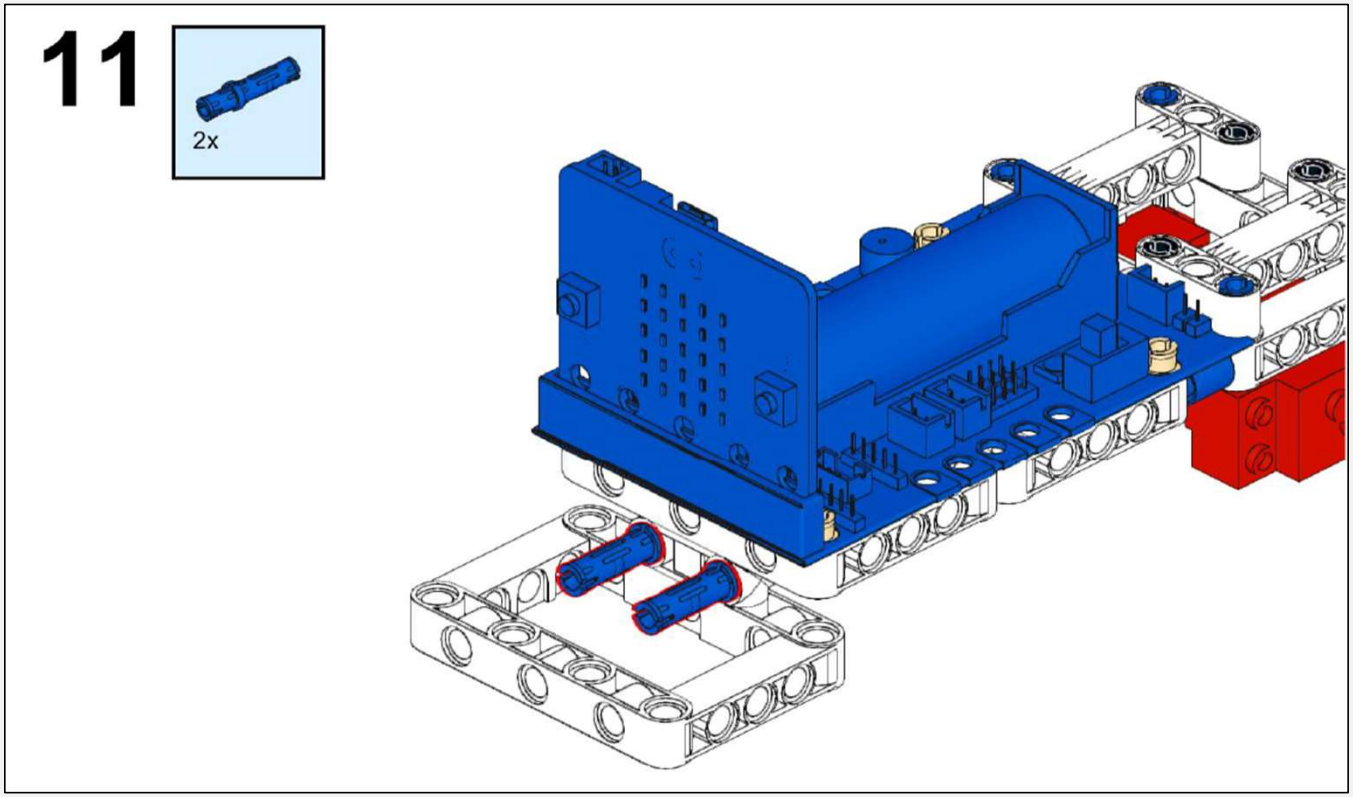



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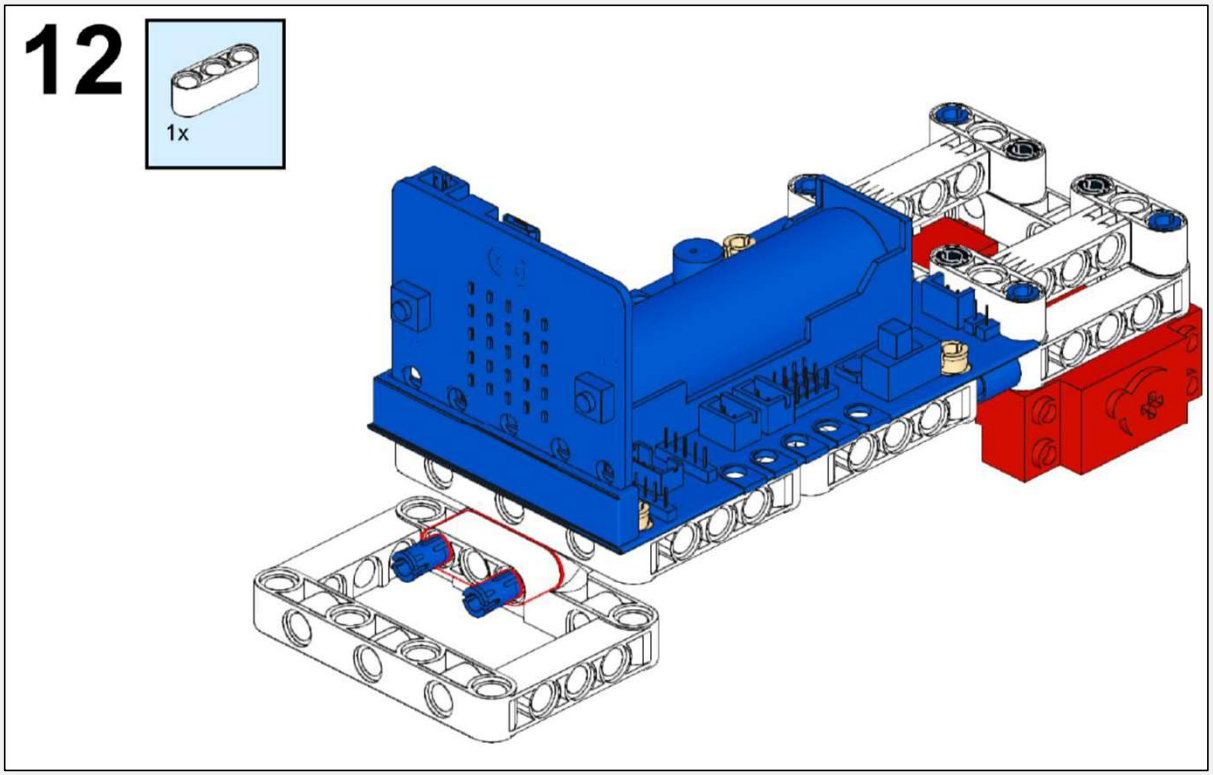



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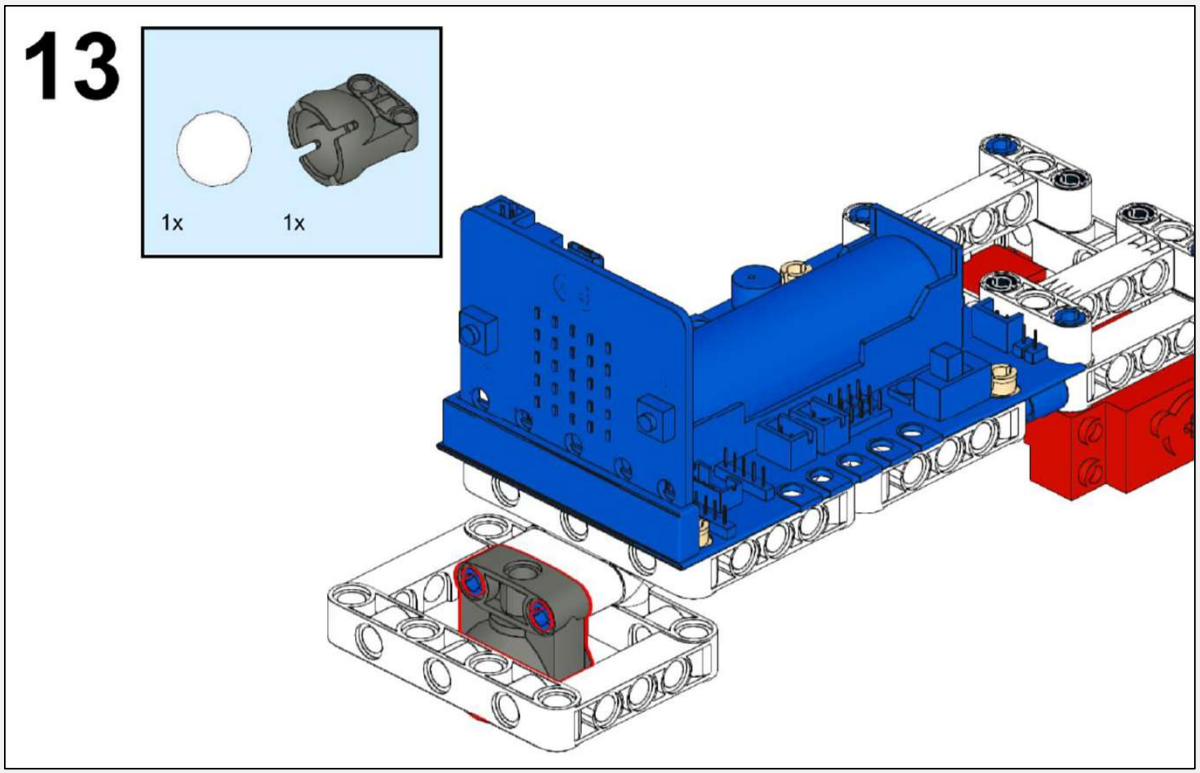



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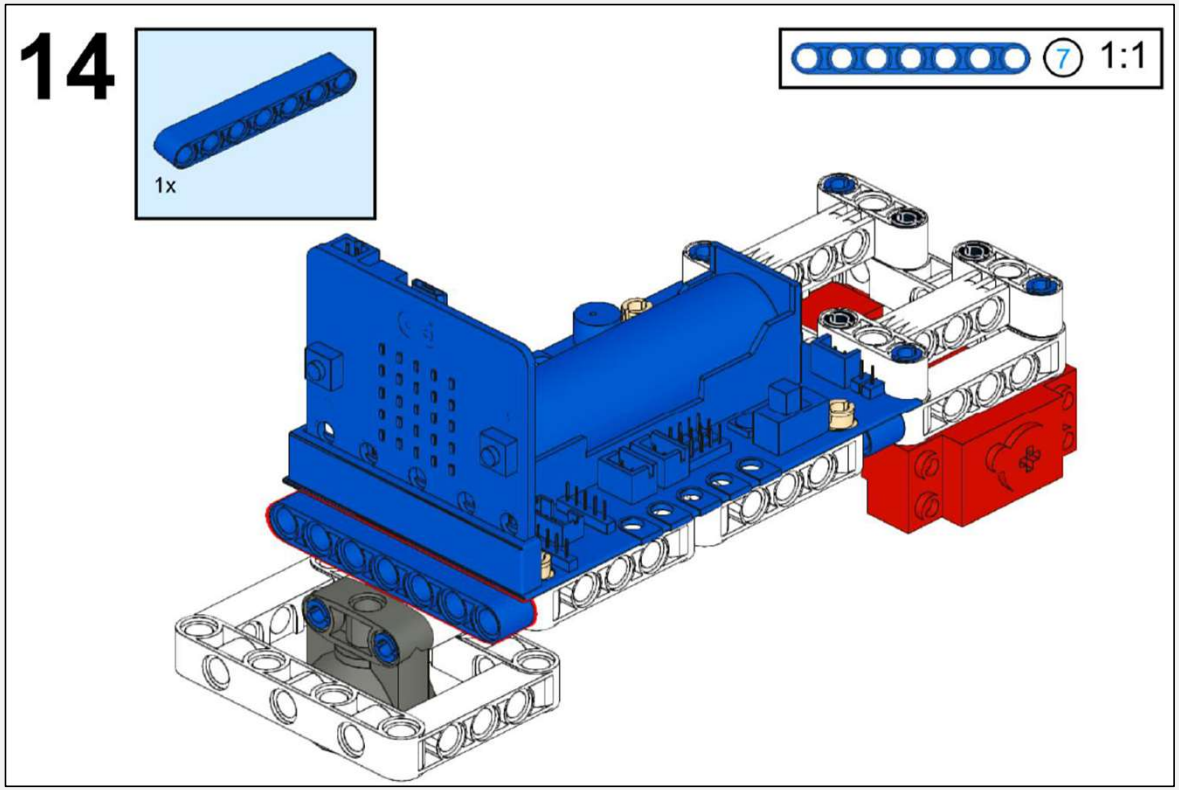



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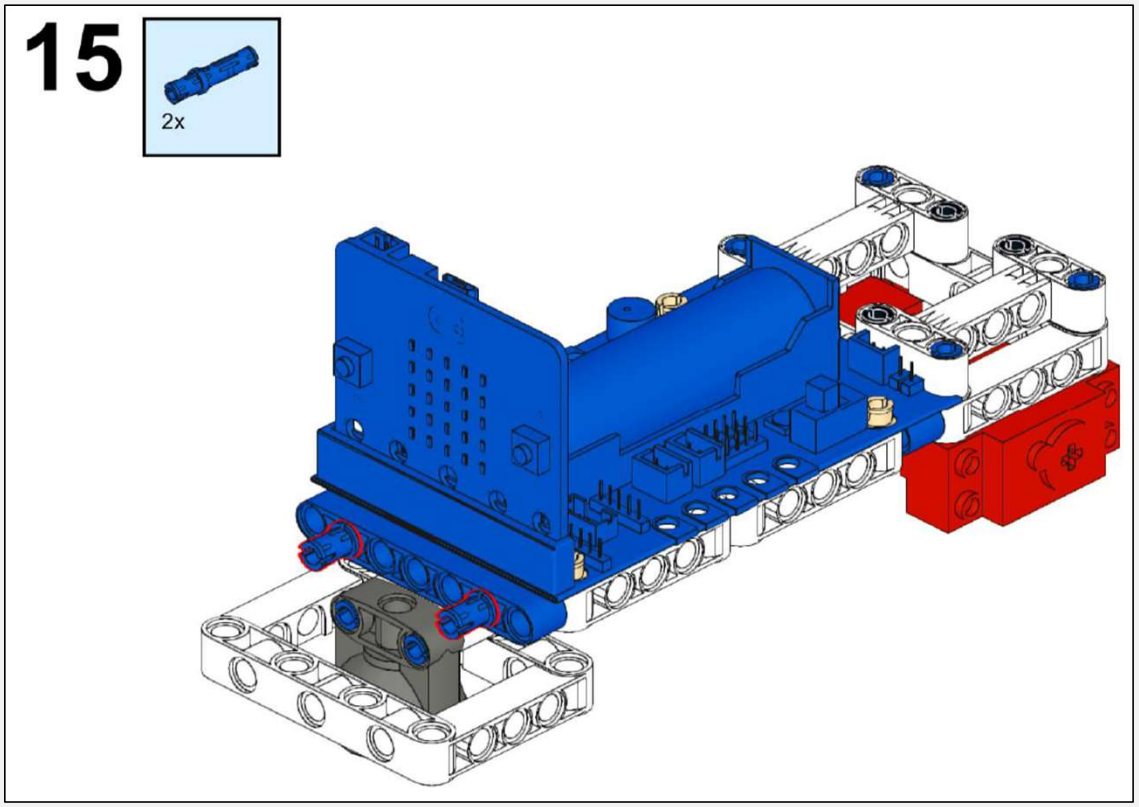



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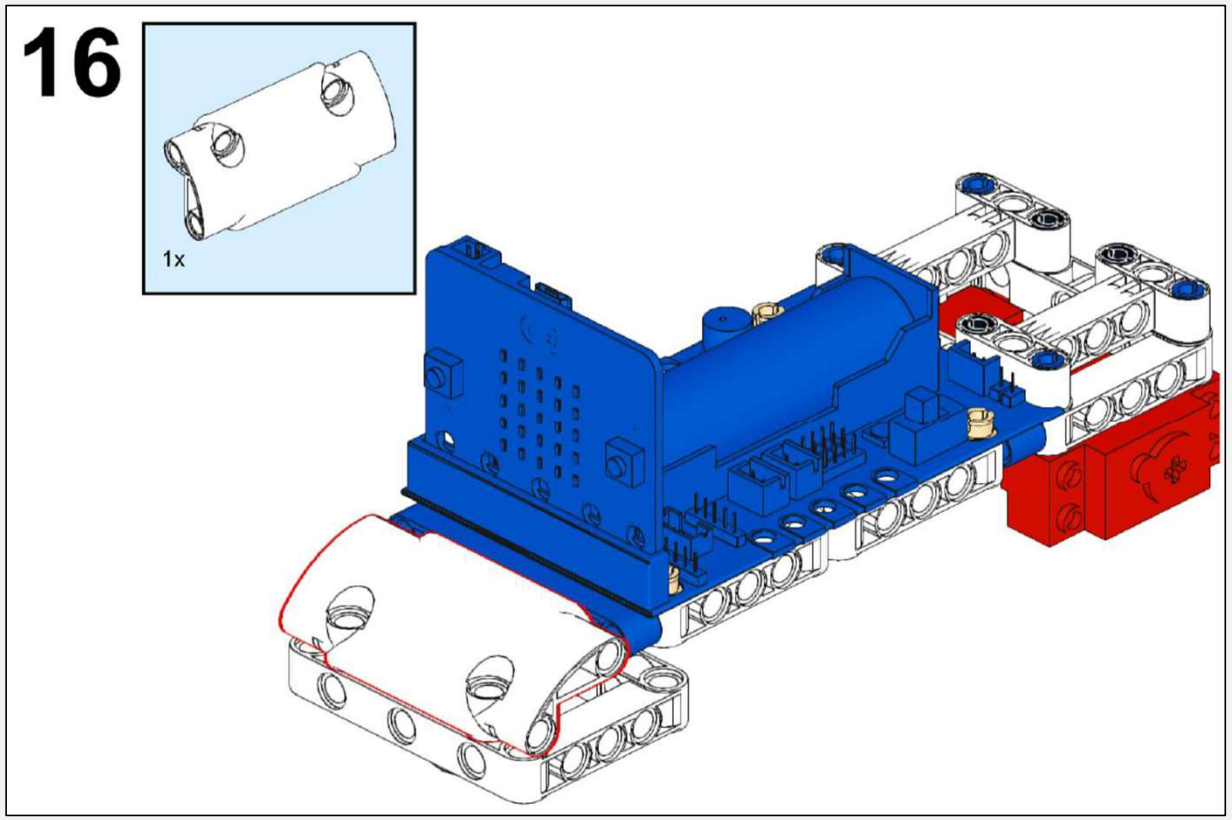



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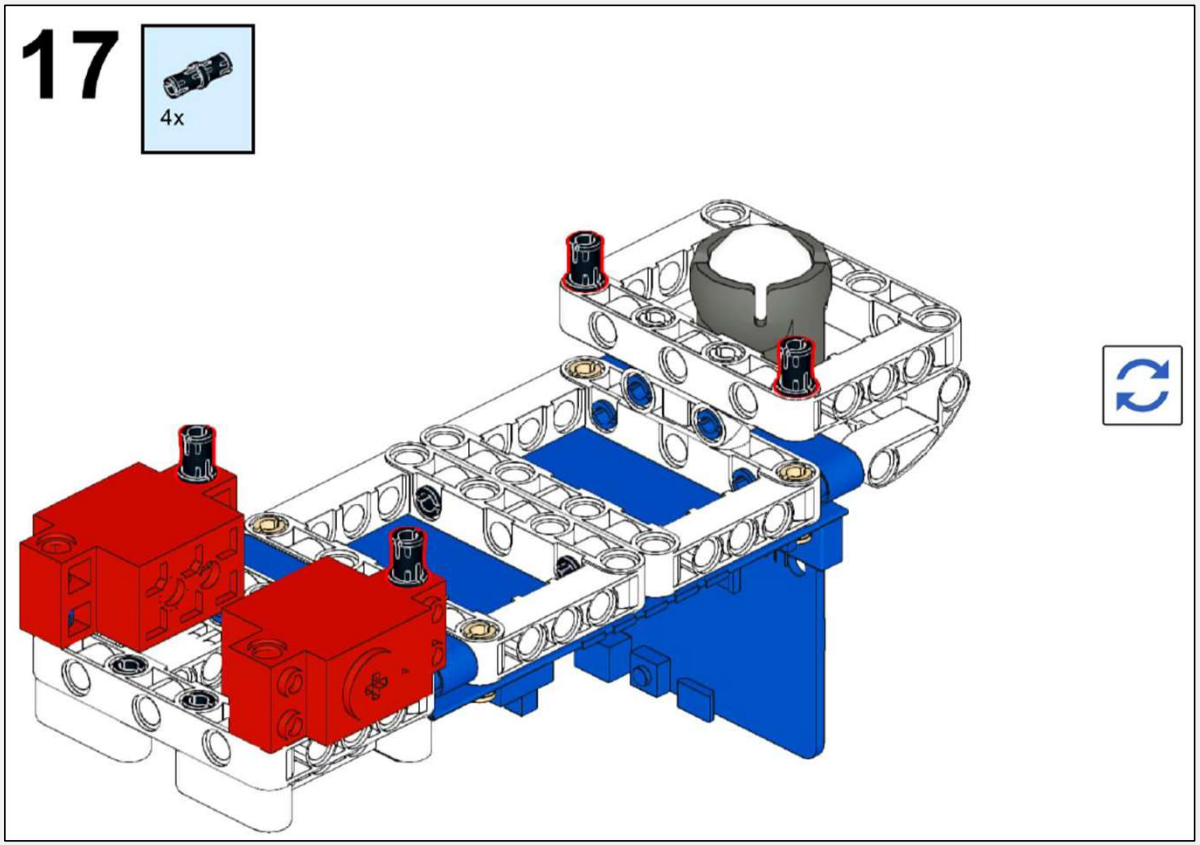



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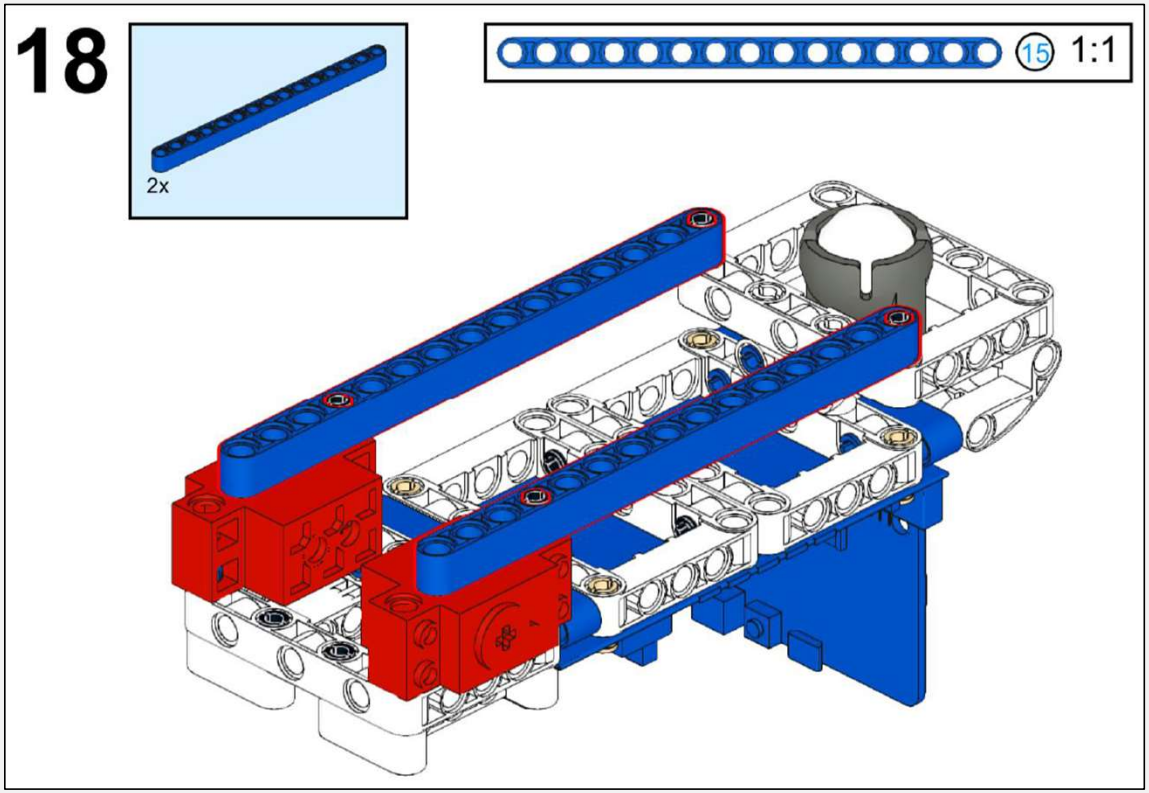



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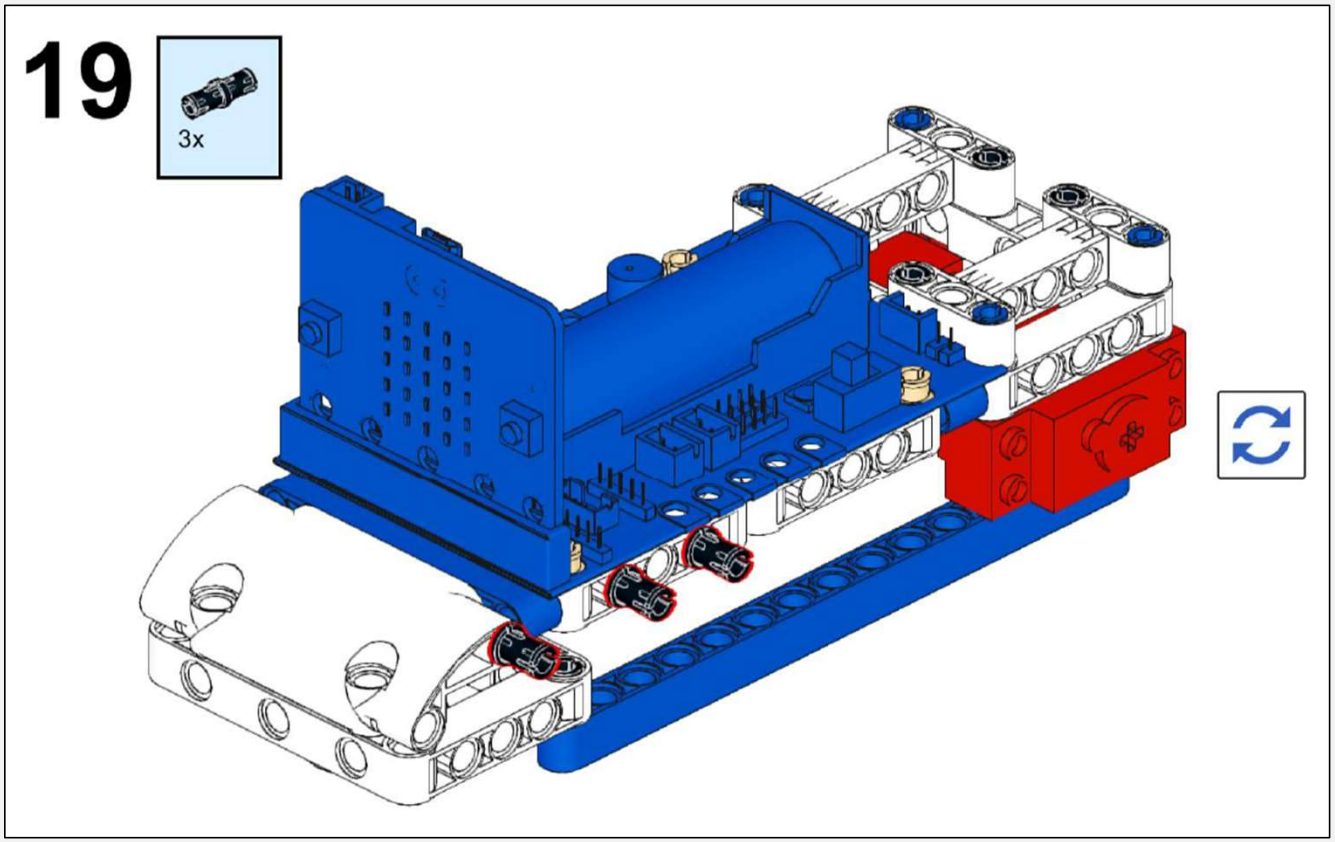



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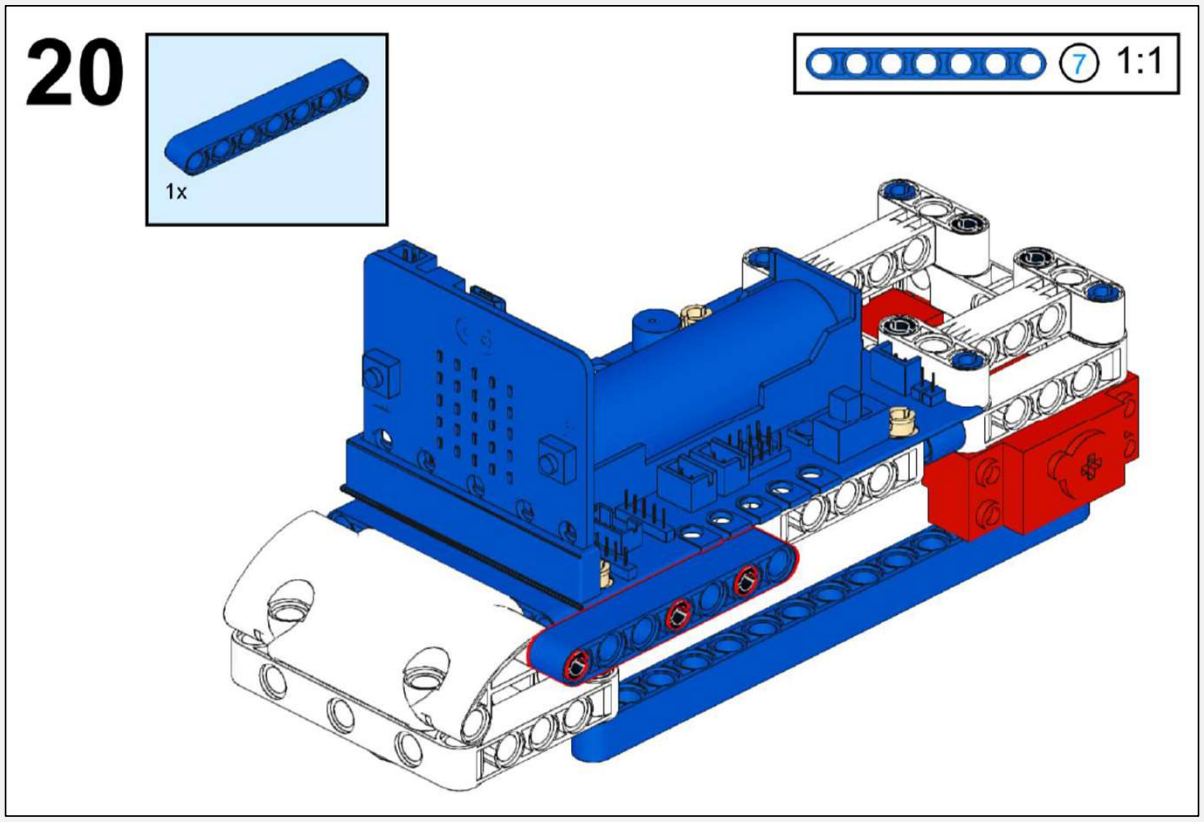



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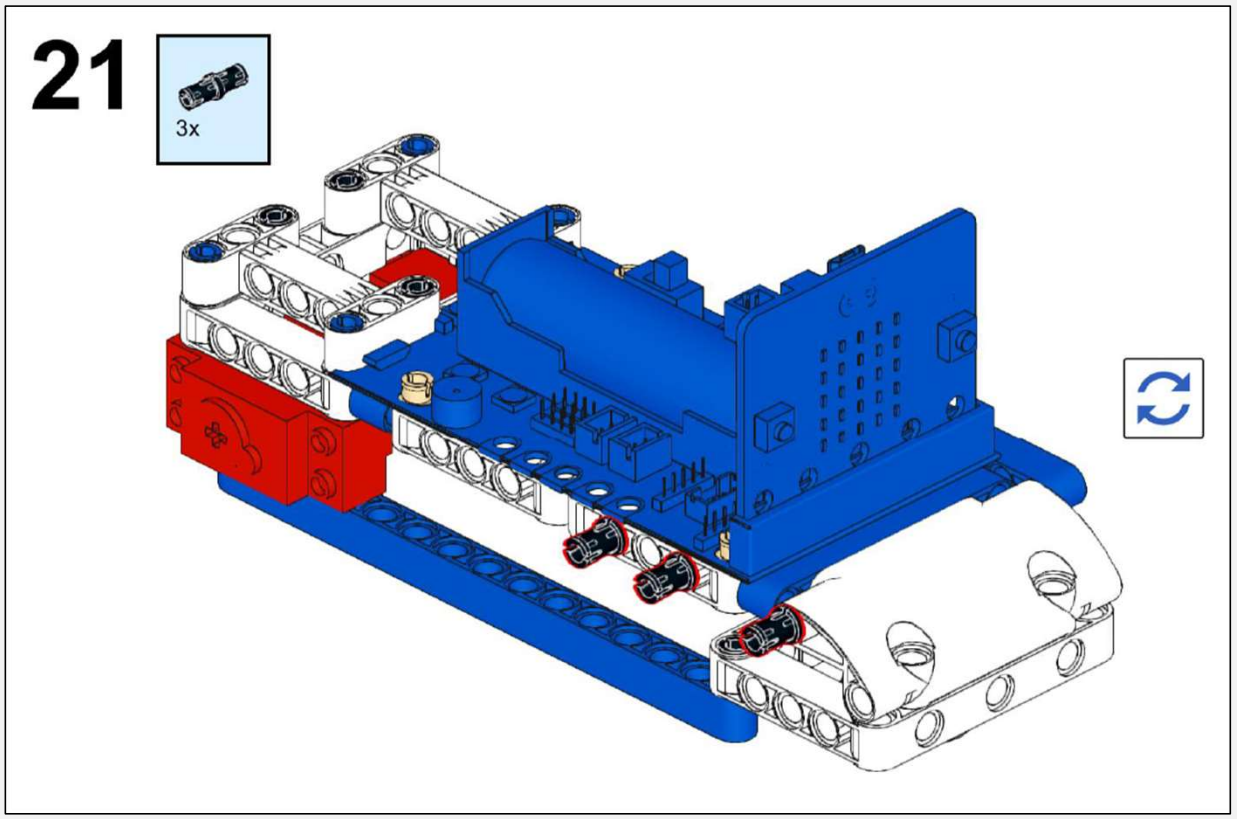



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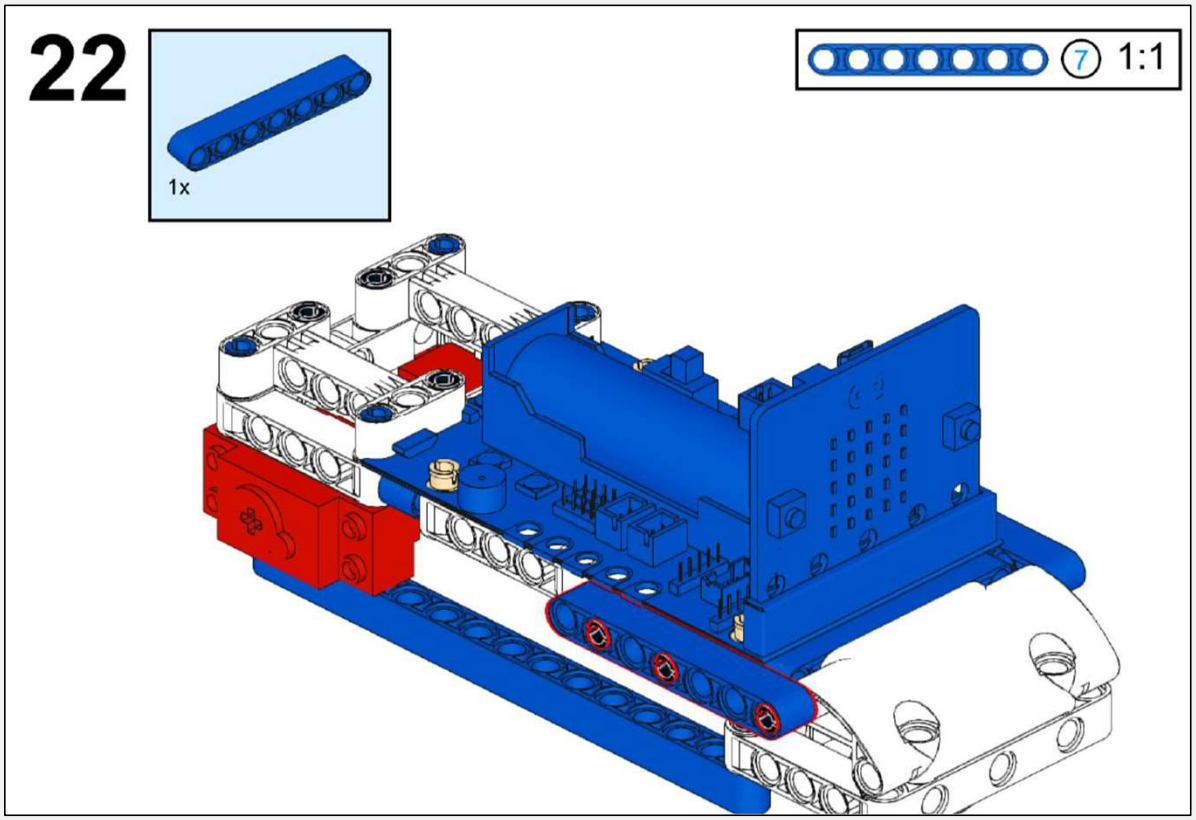



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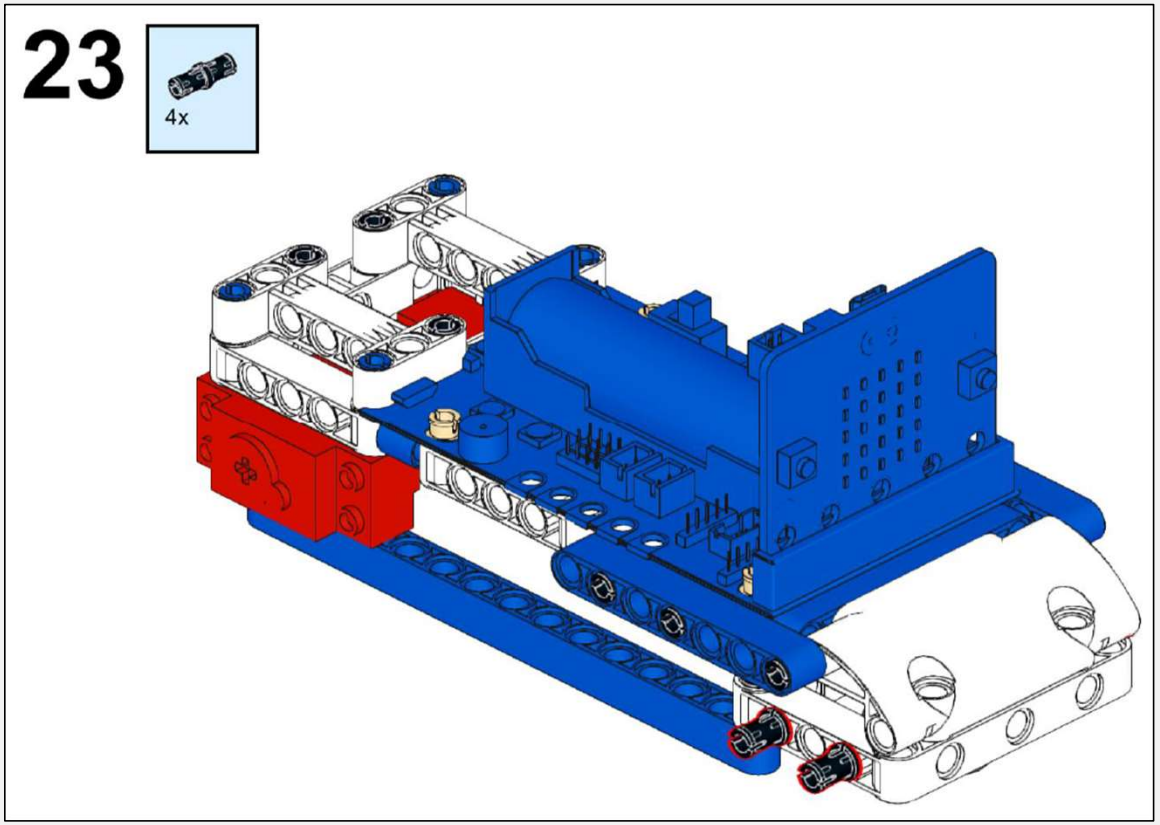



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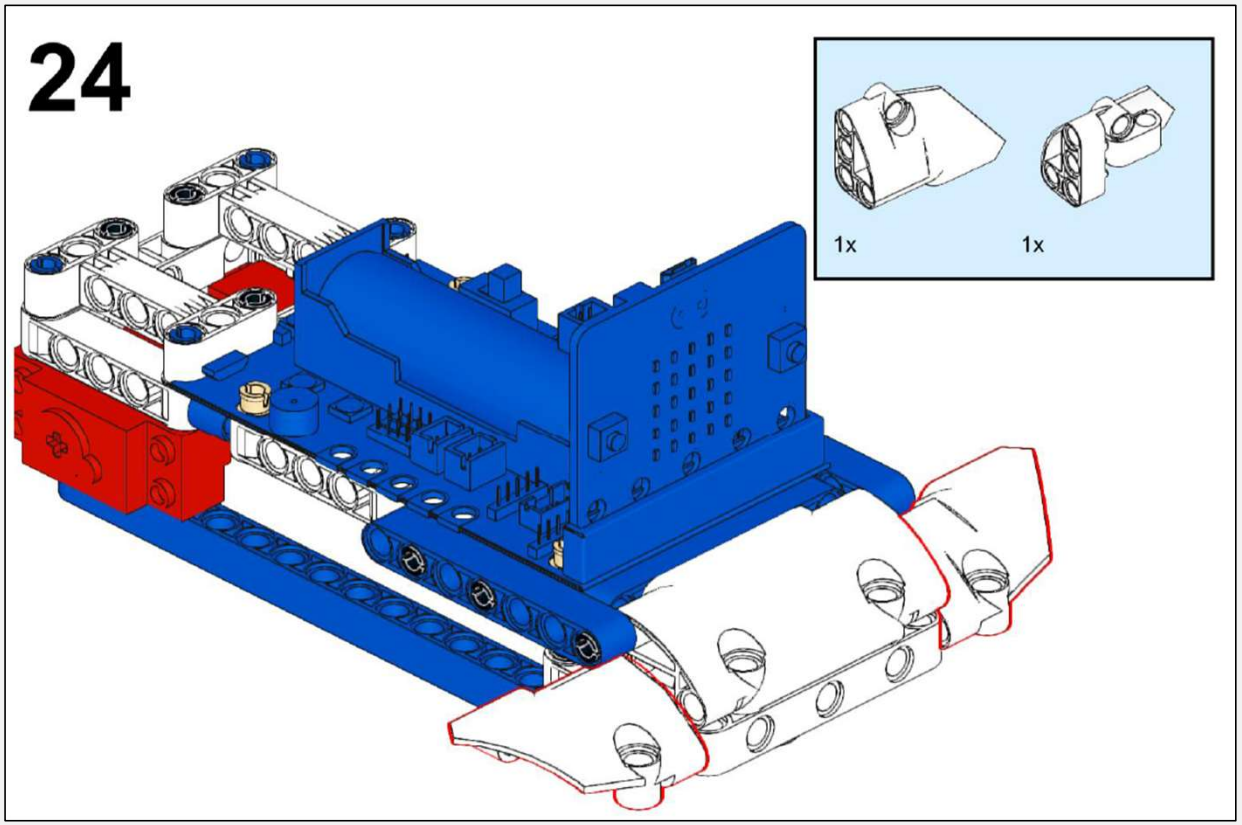



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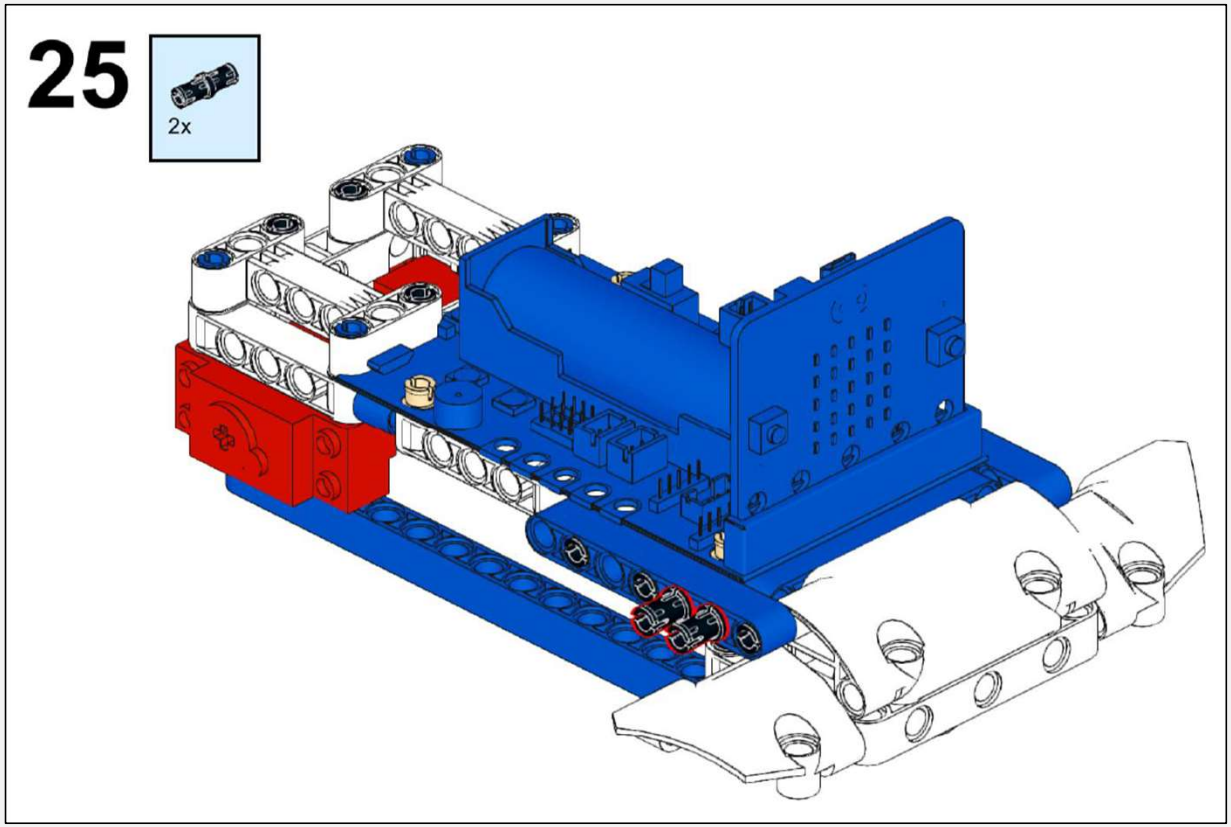



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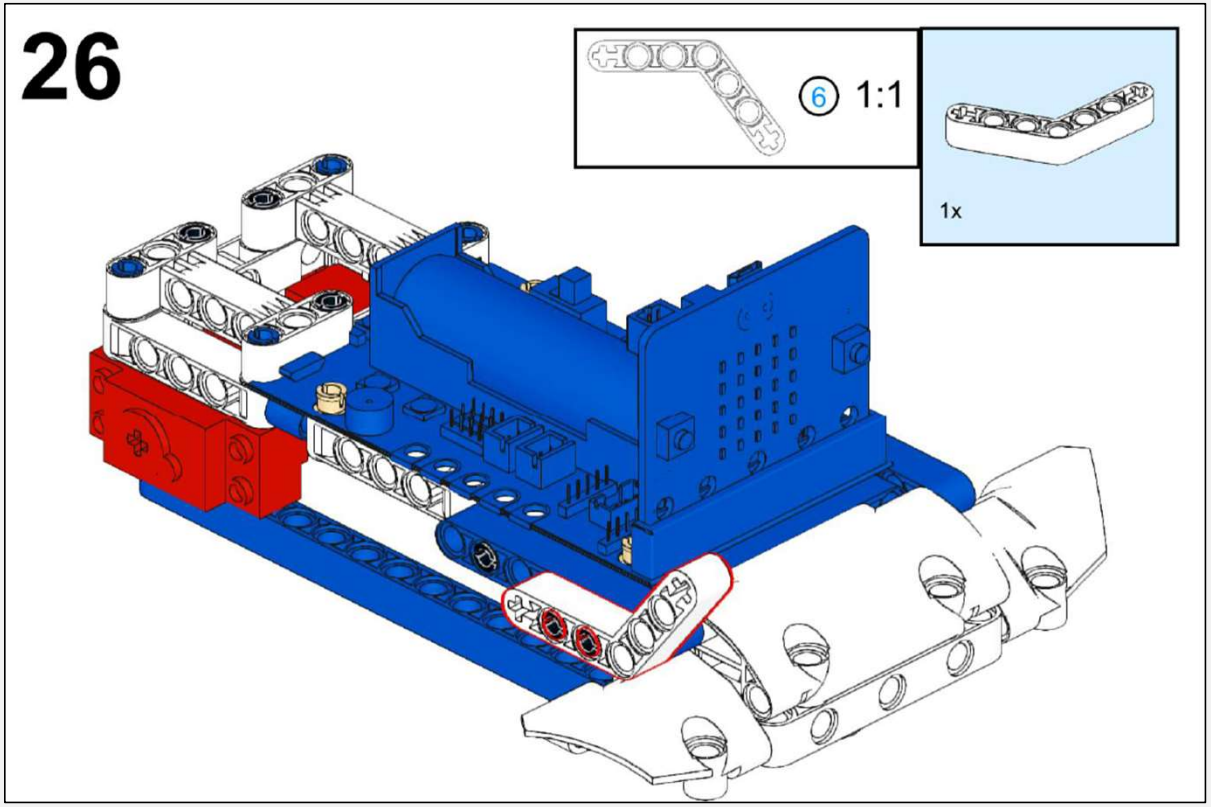



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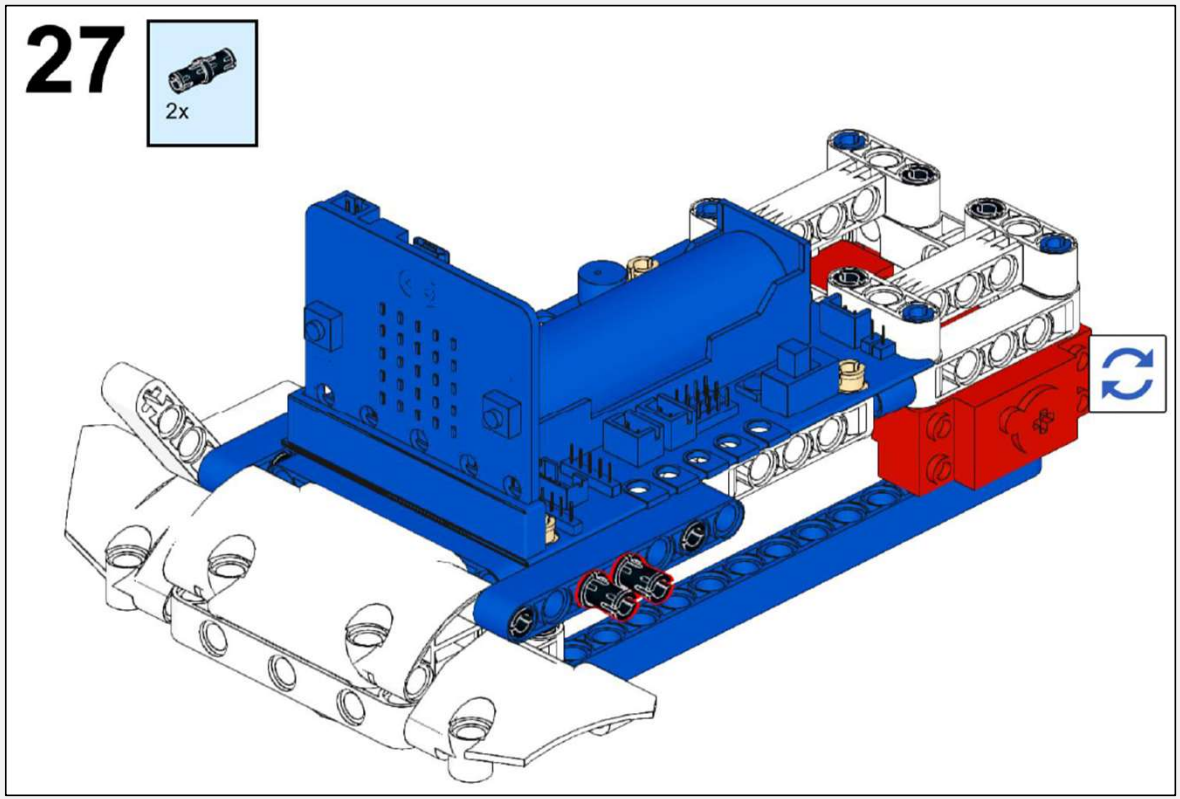



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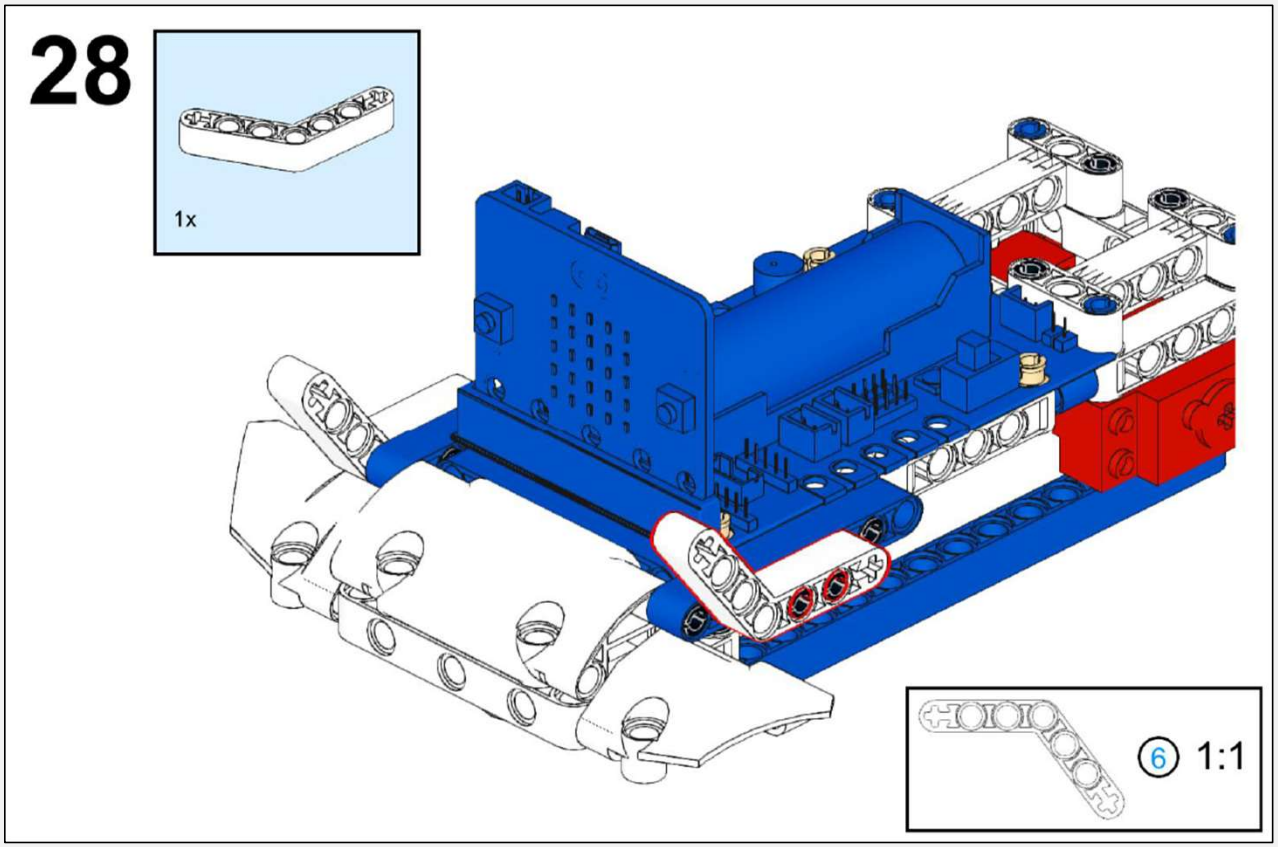



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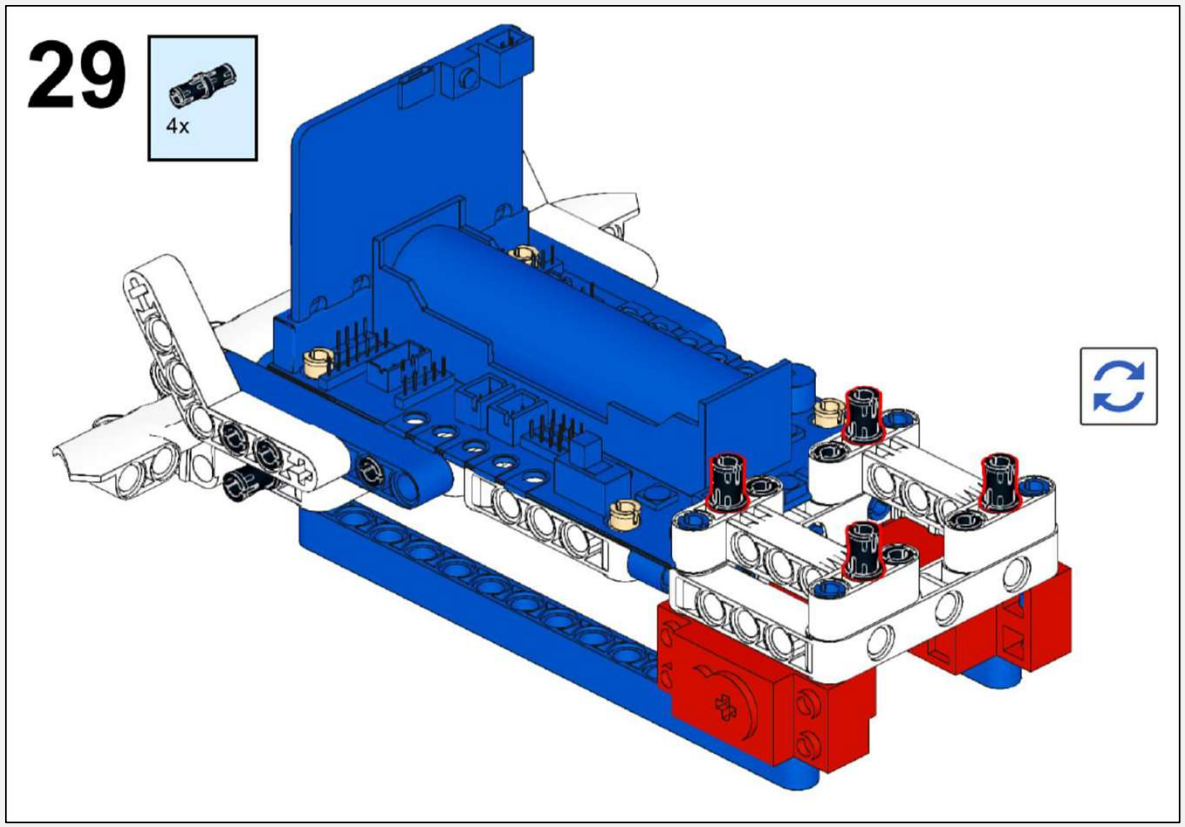



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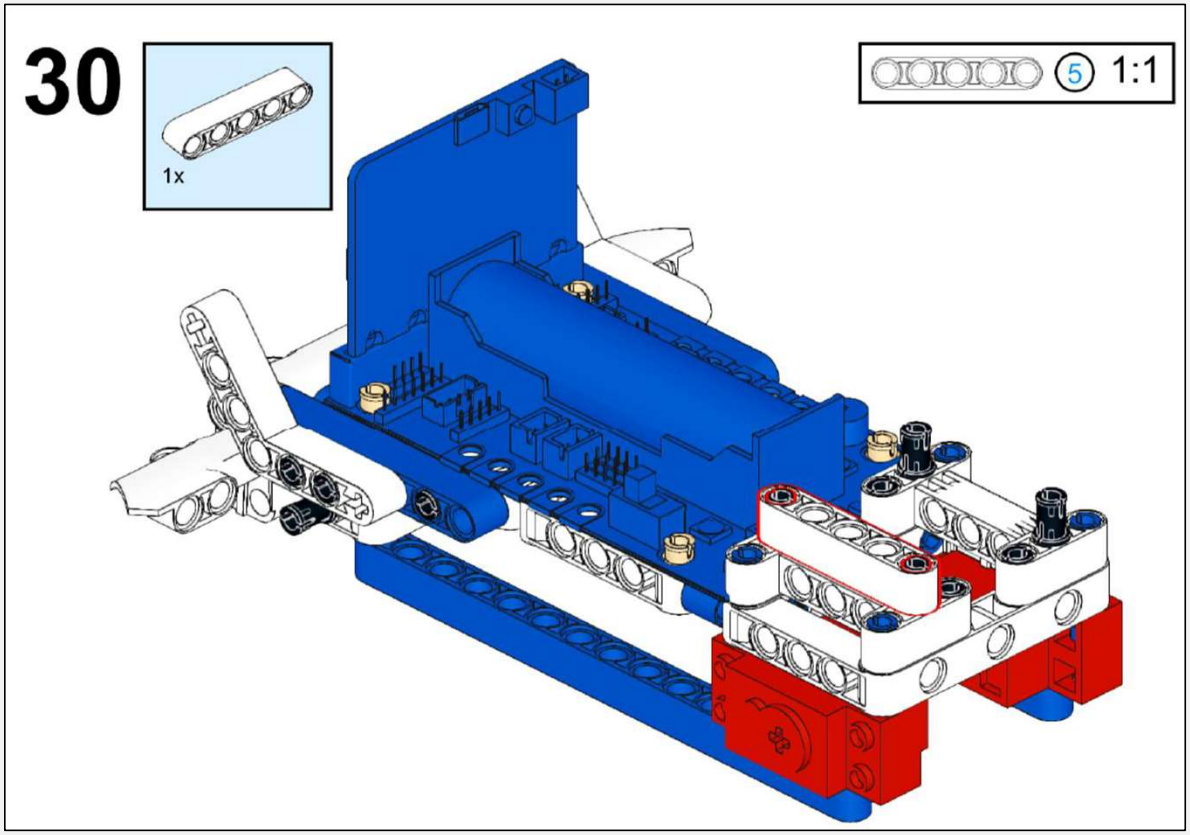



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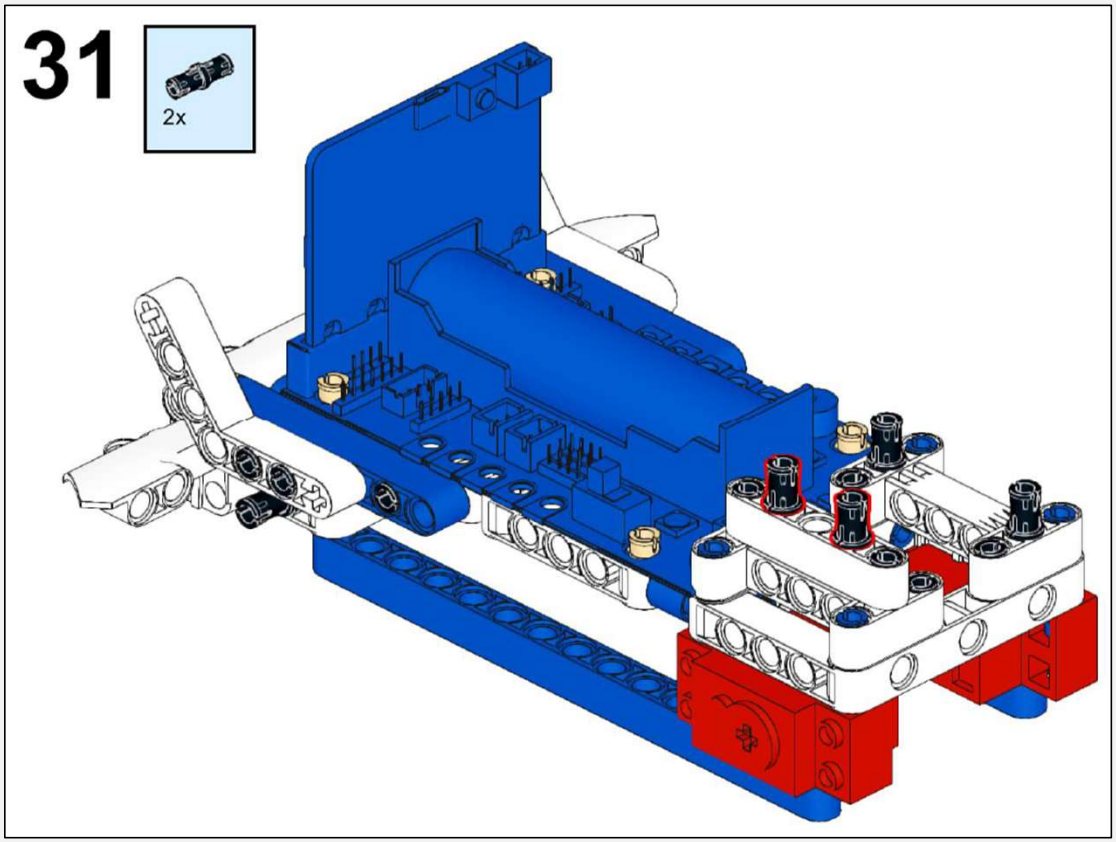



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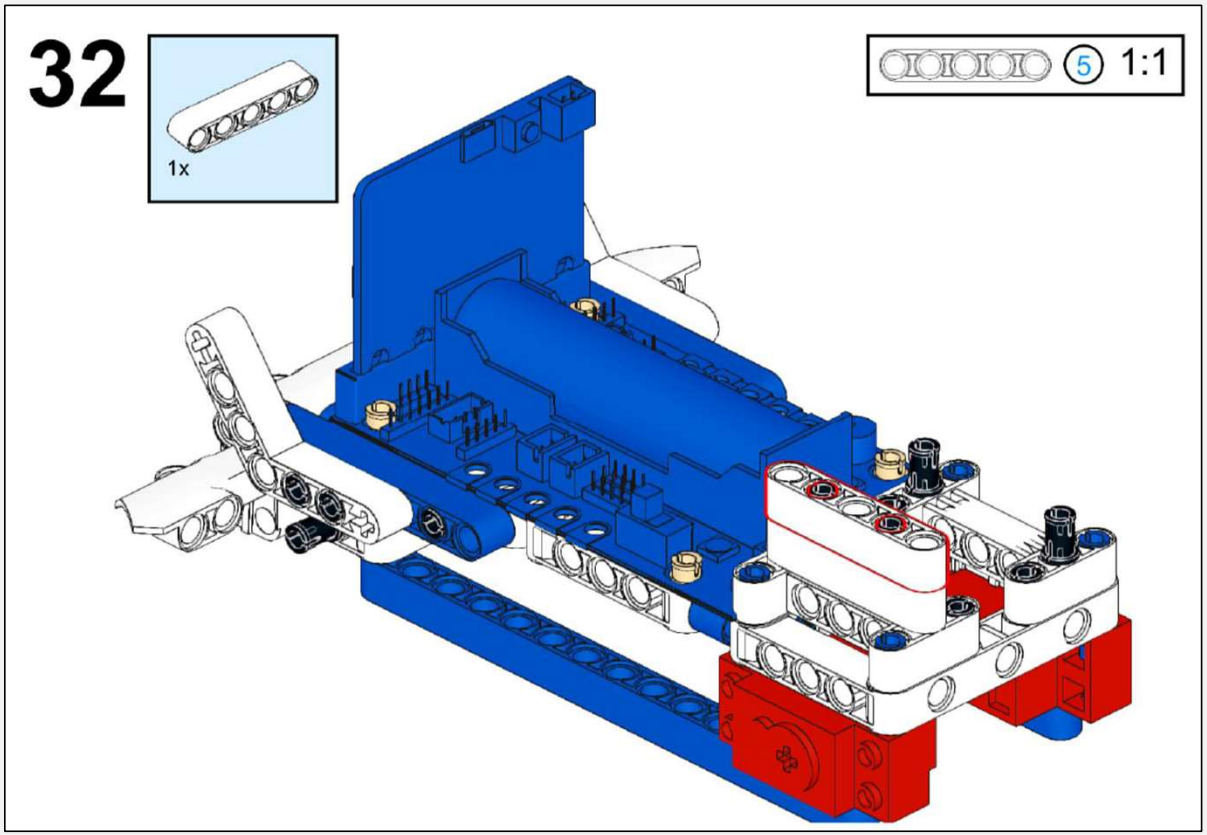



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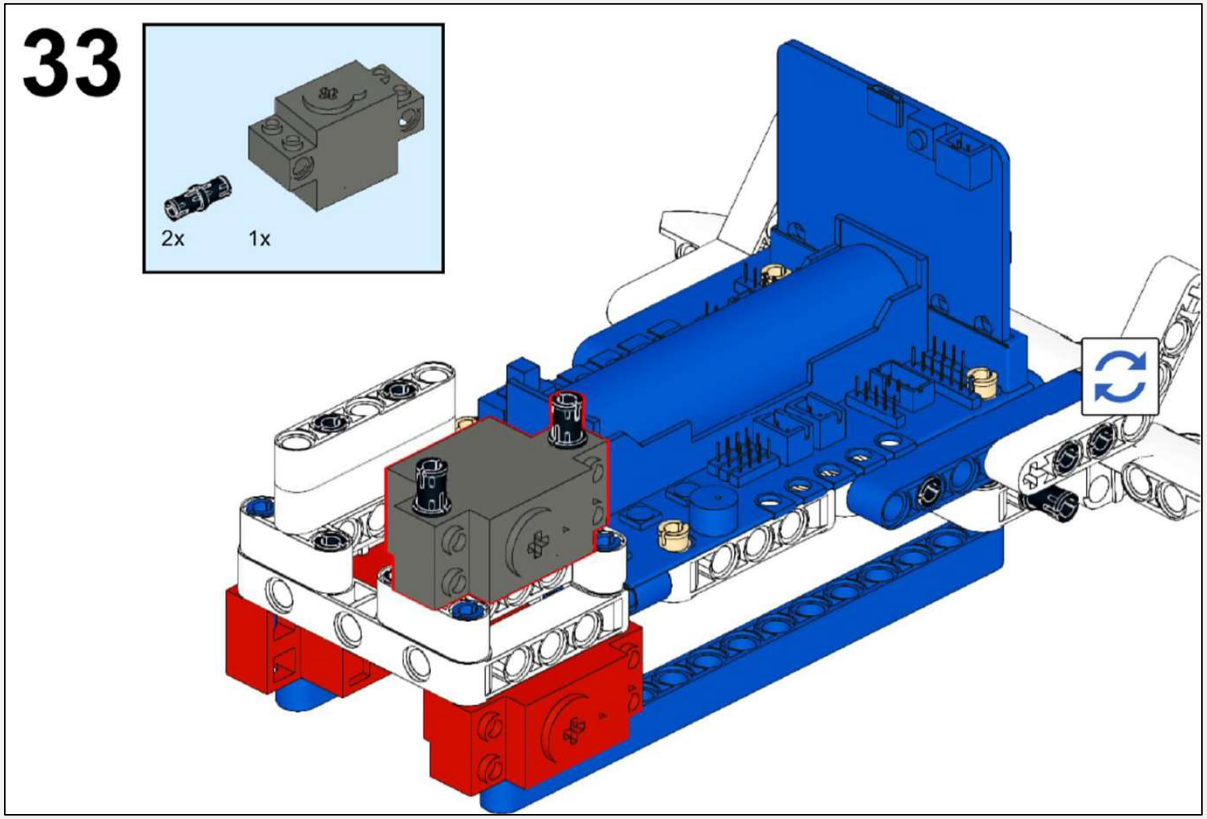



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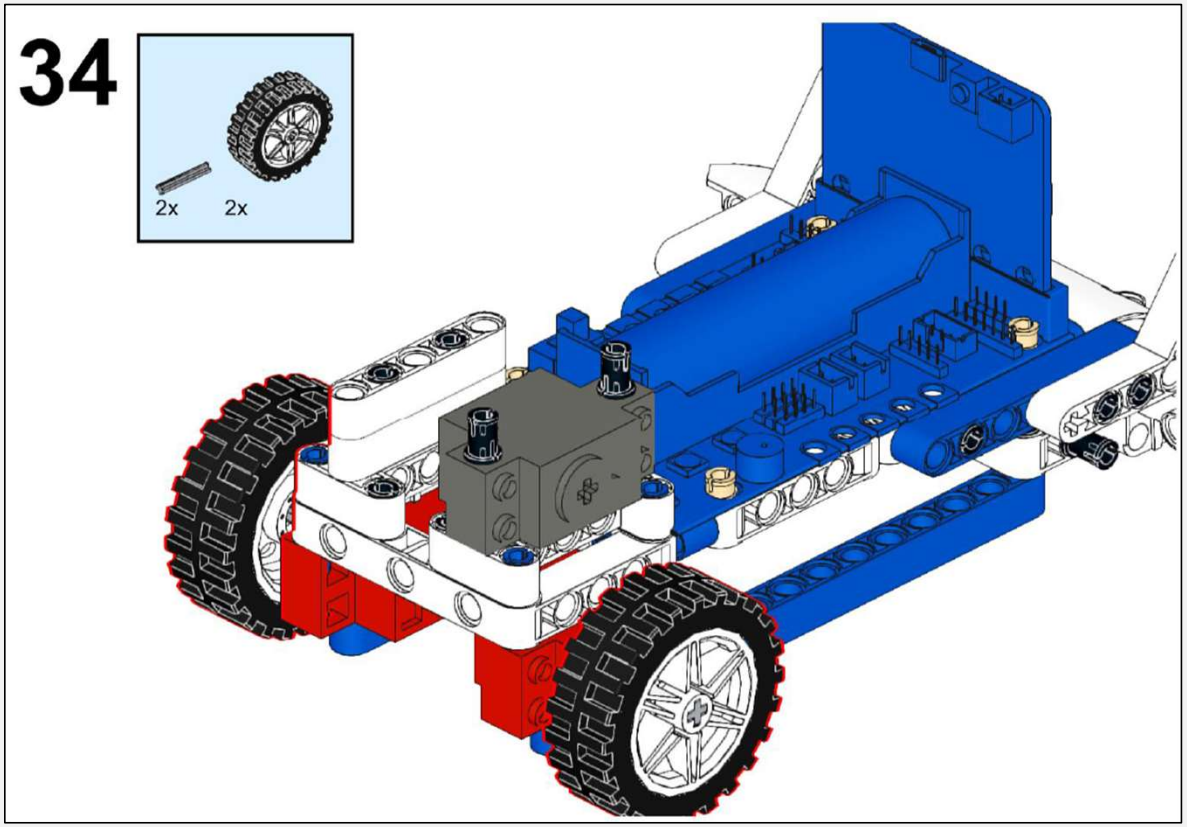



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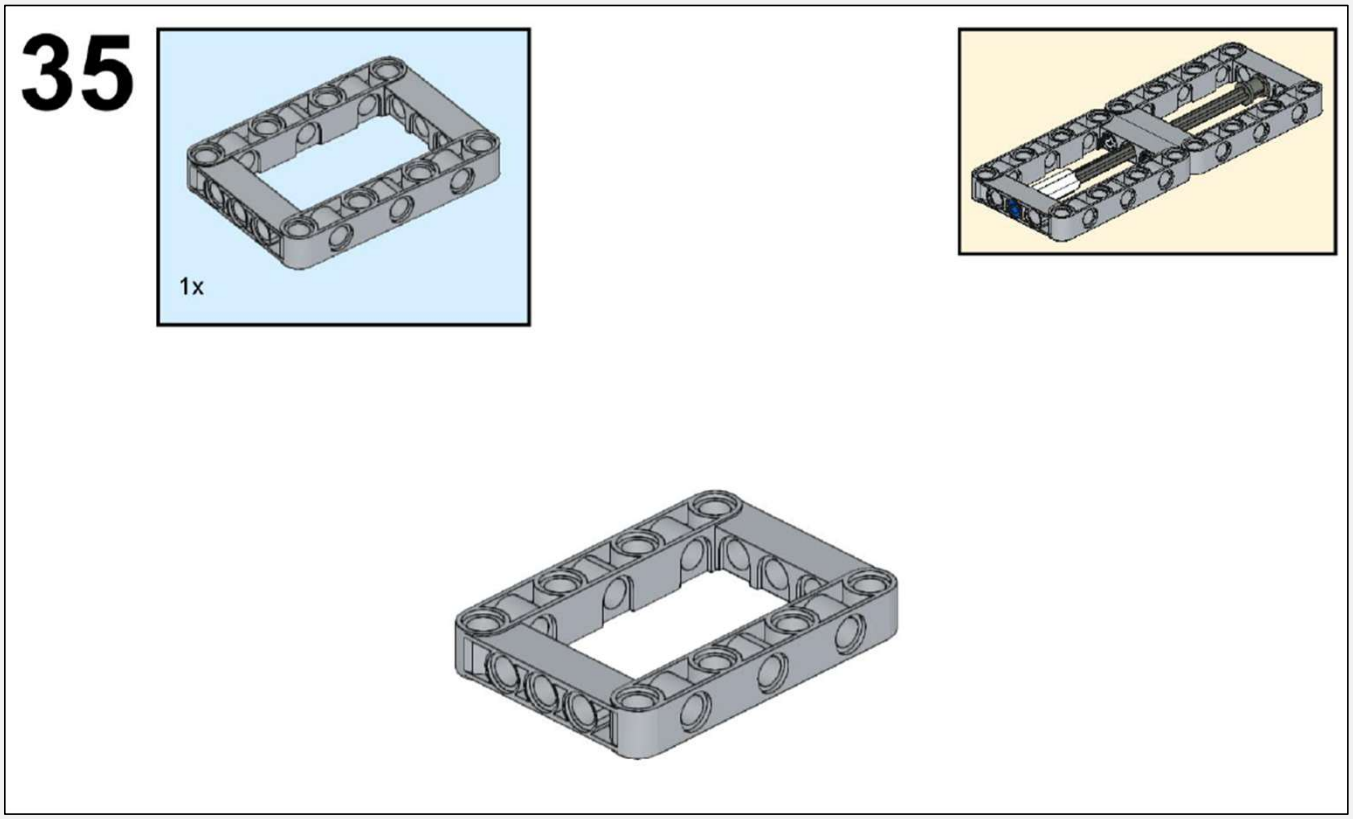



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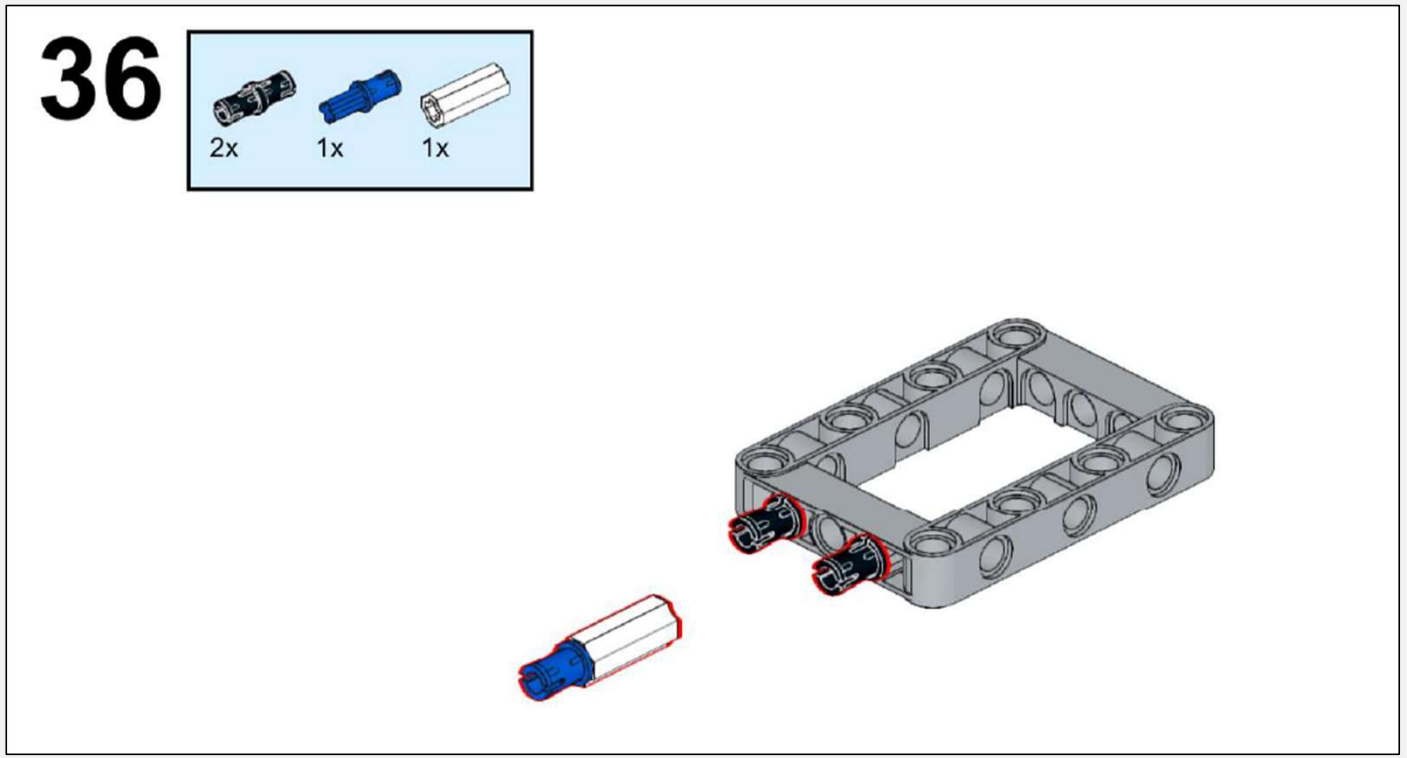



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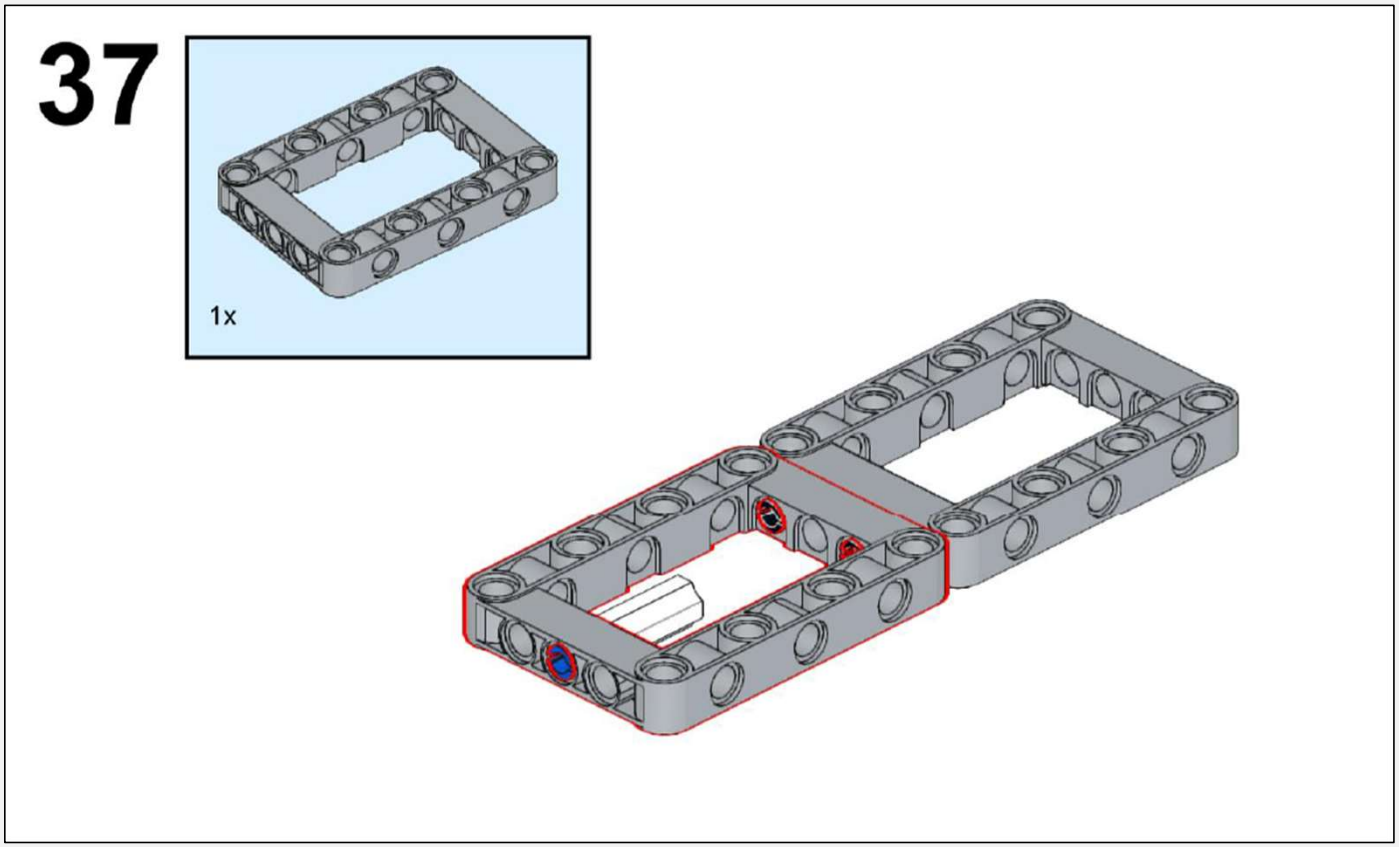



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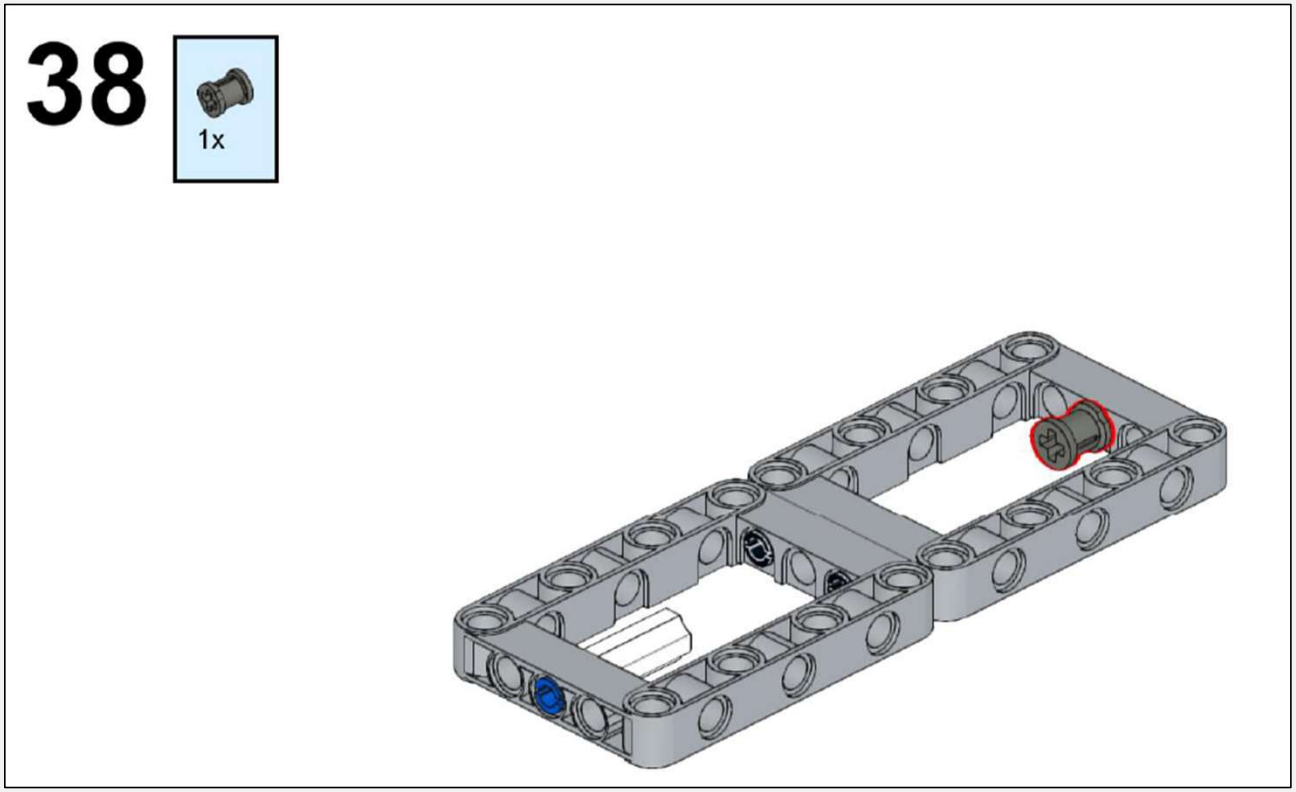



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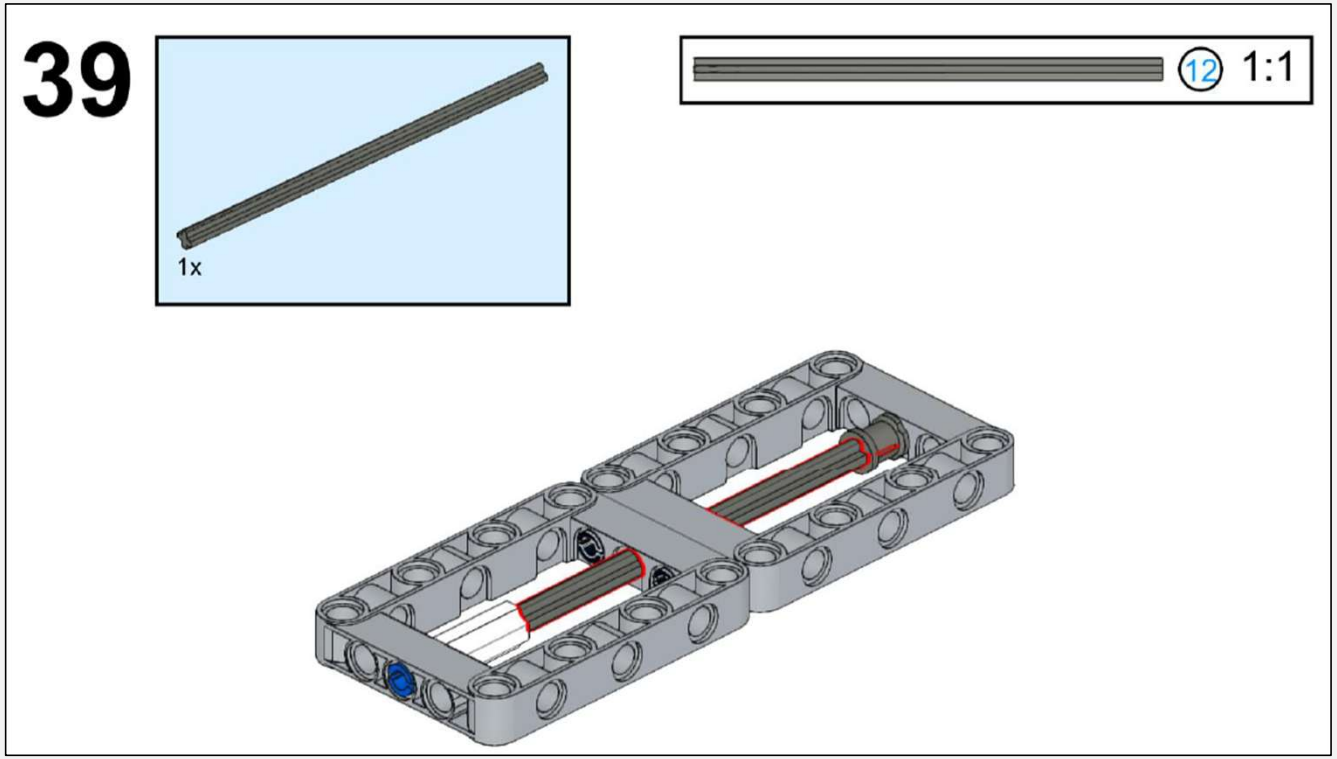



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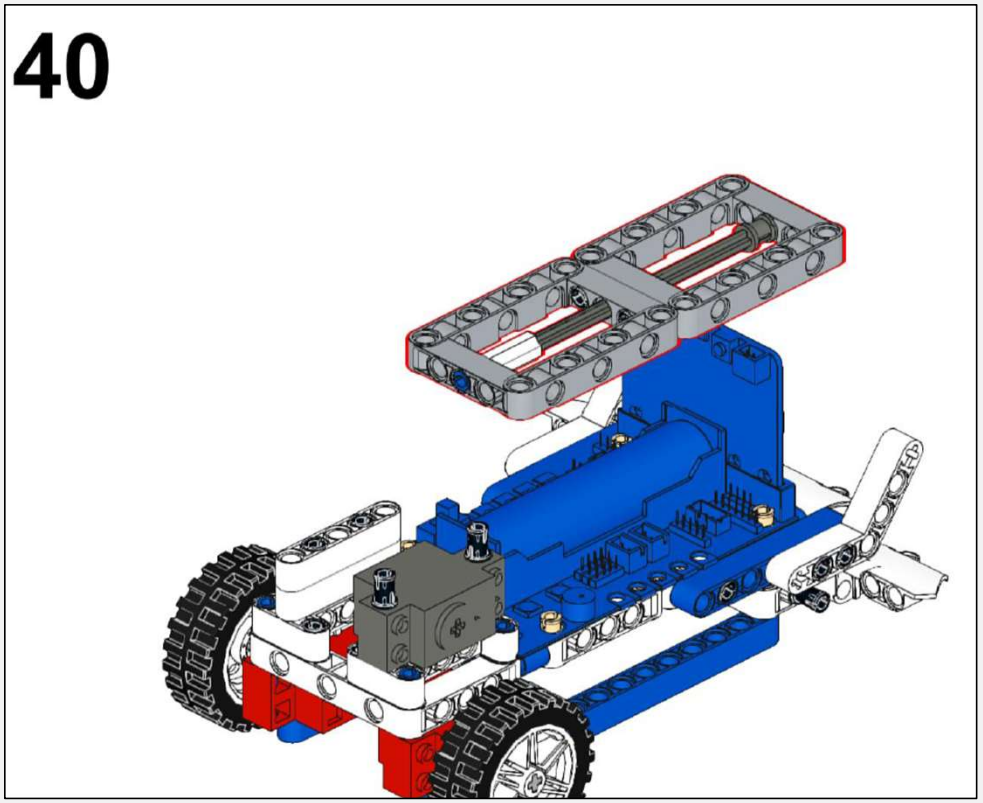



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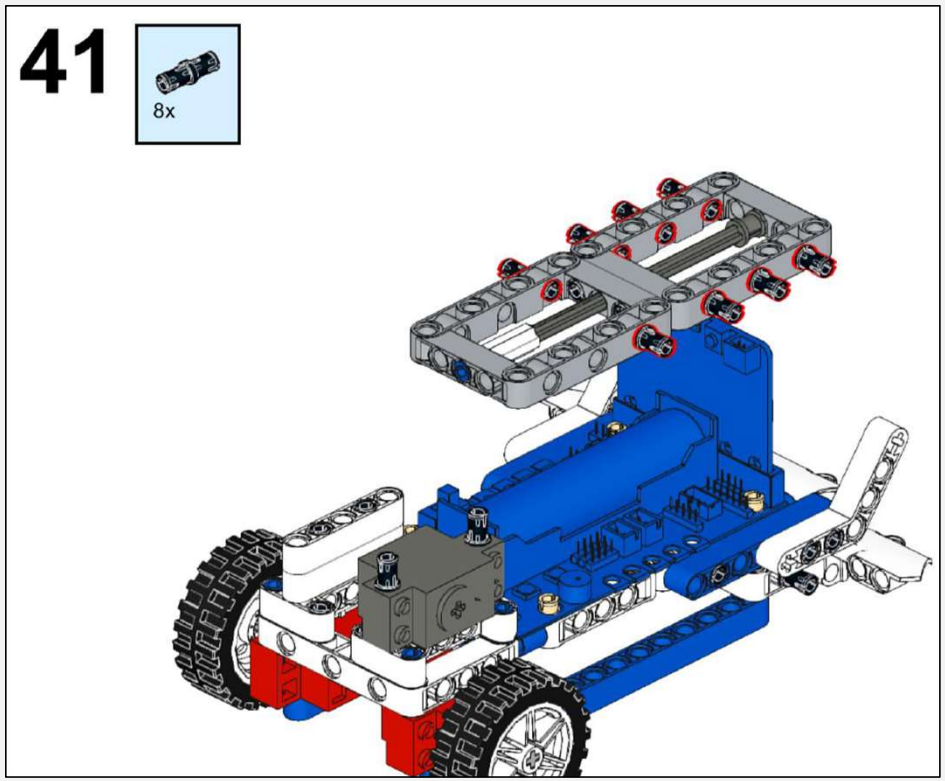



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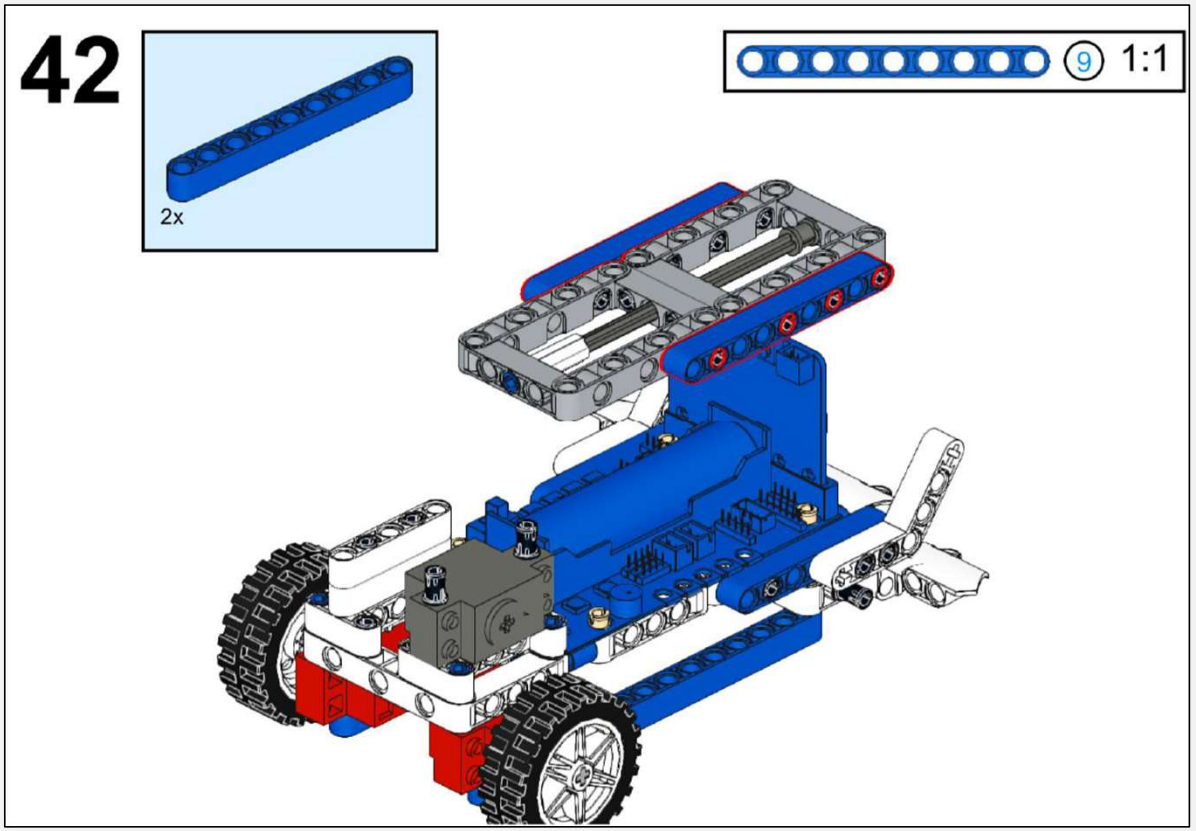



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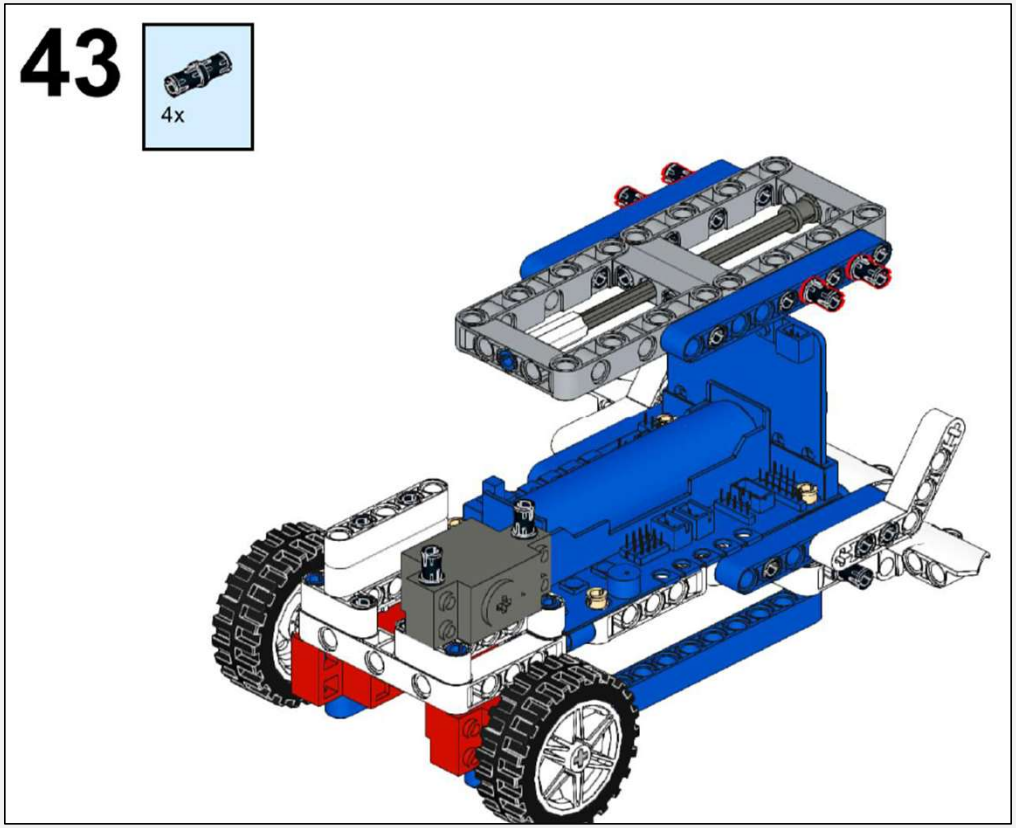



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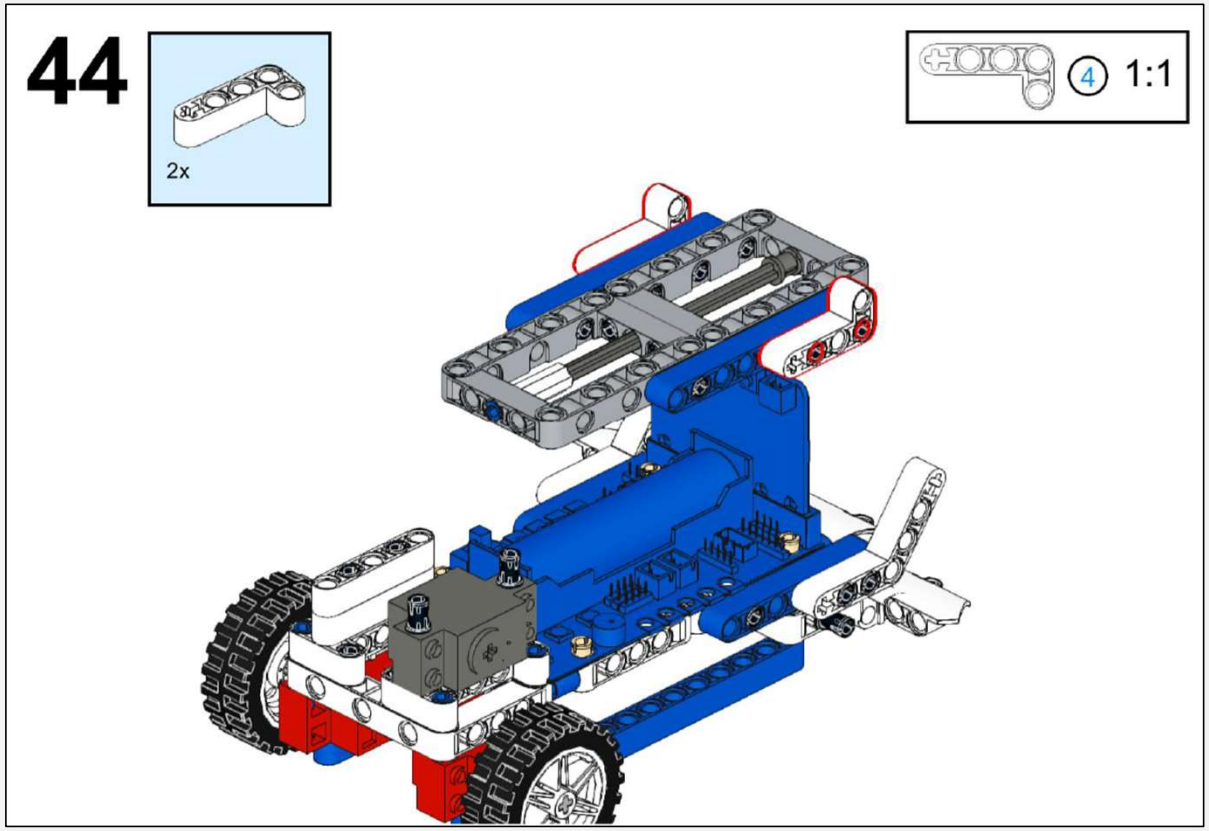



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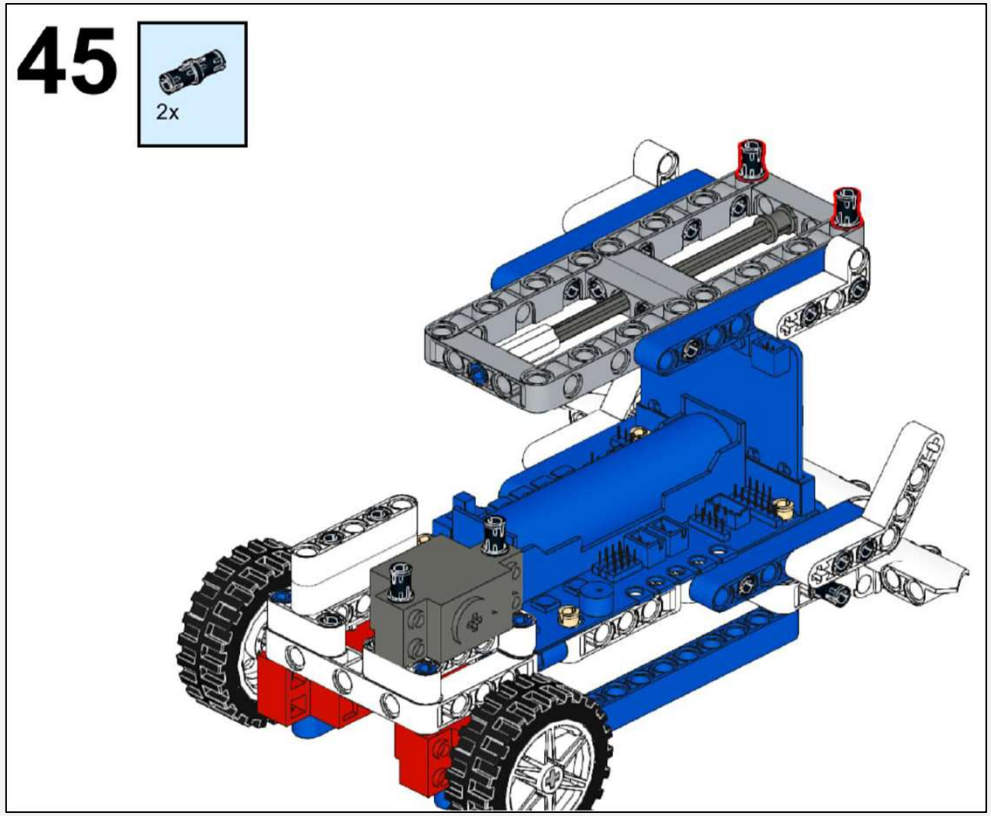



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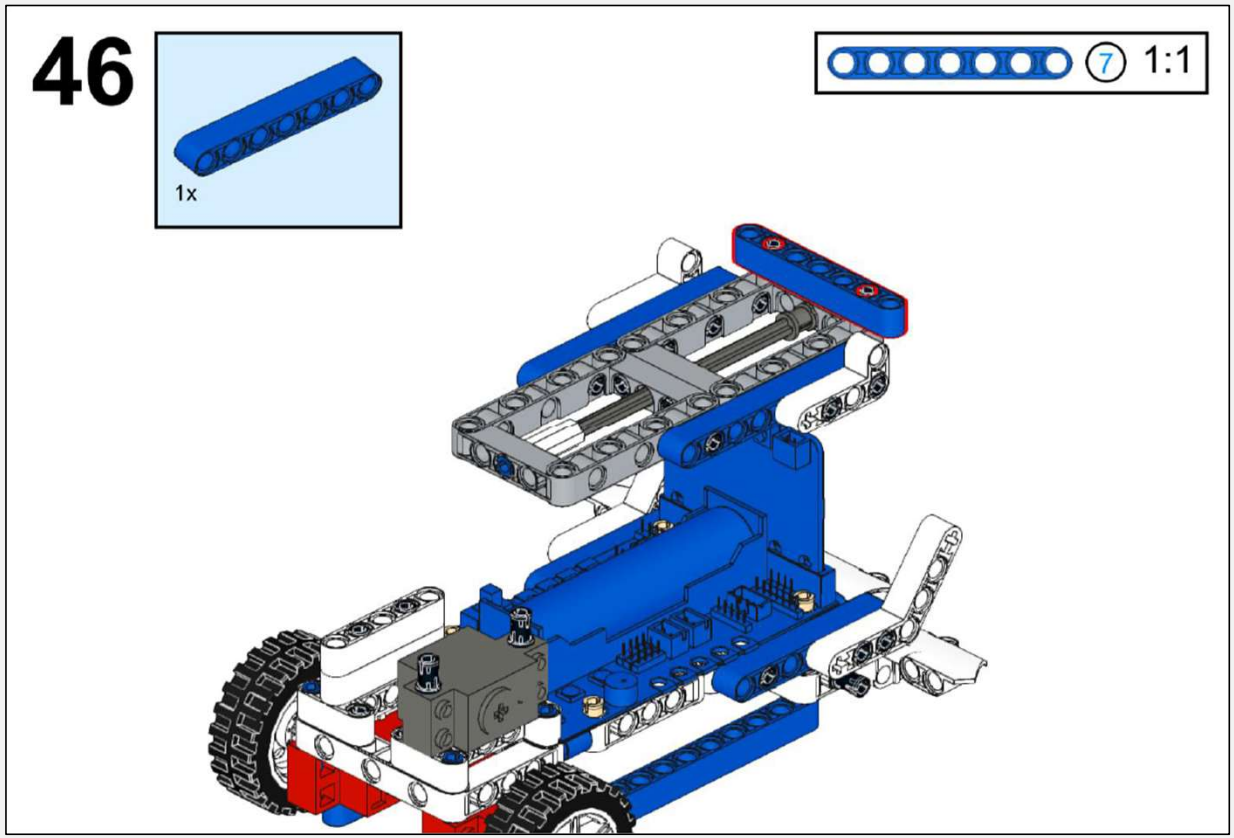



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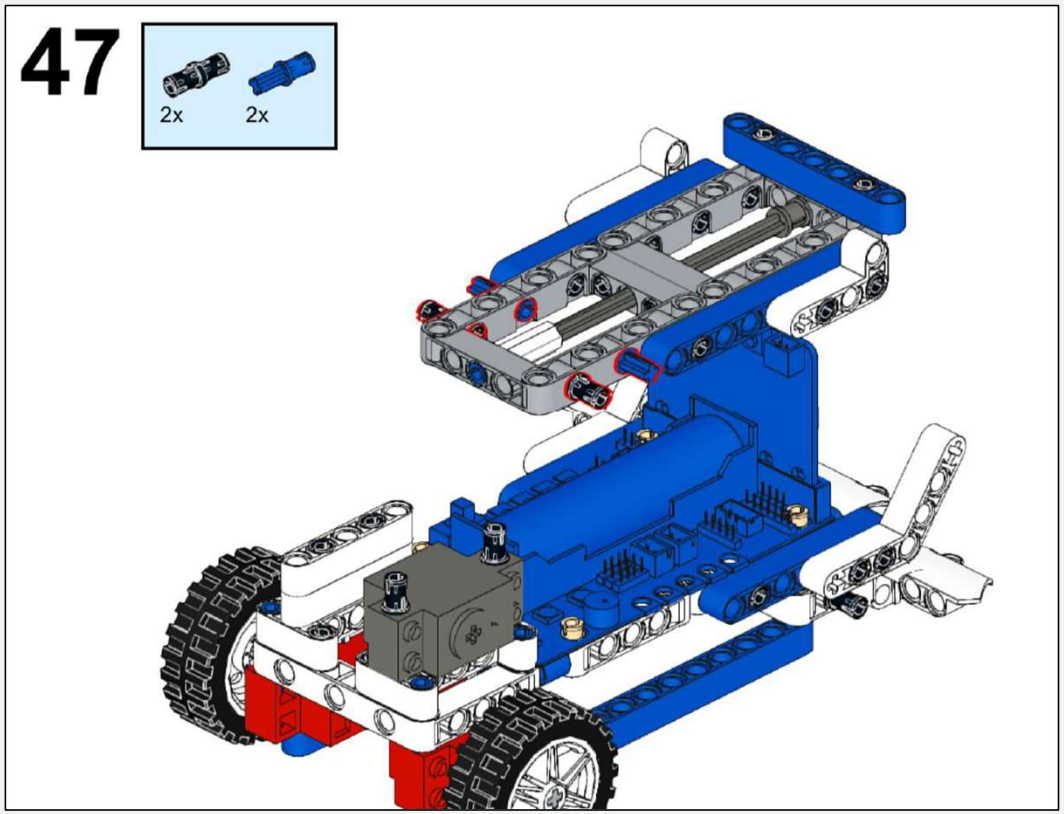



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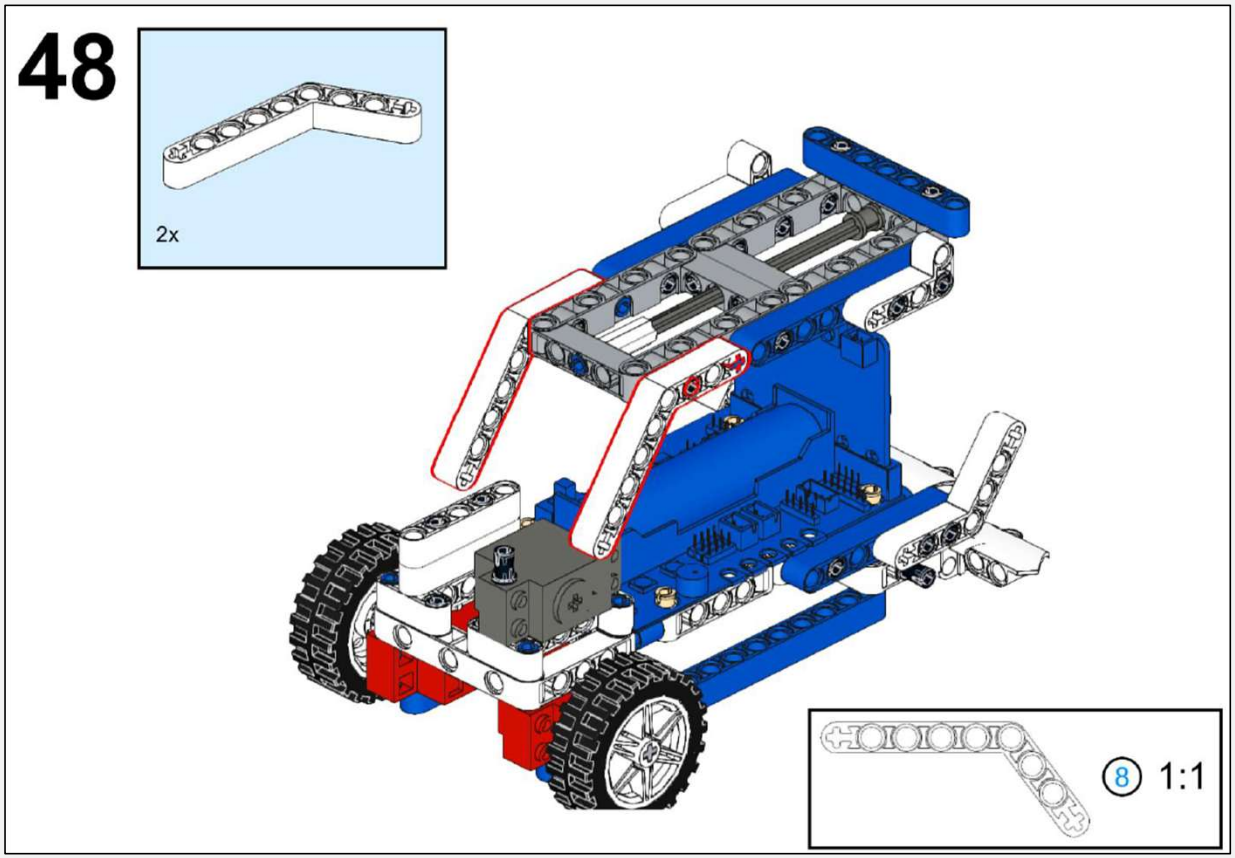
# Step 48





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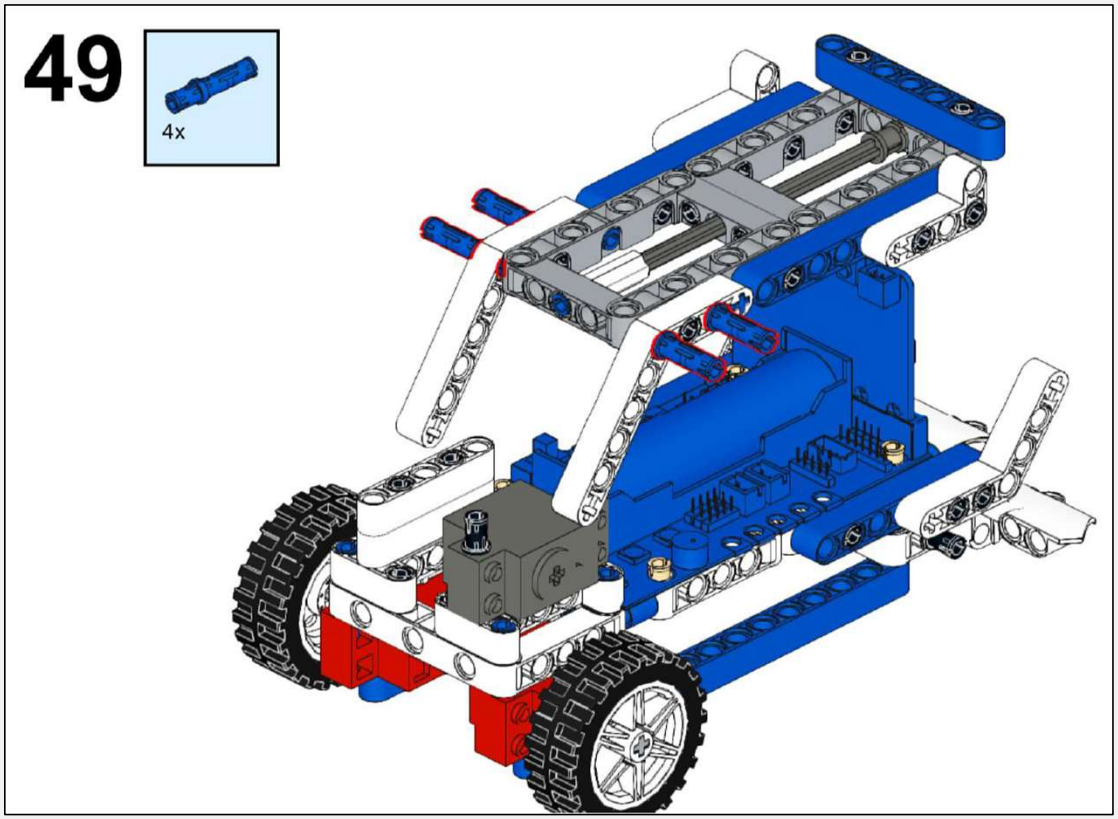
# Step 49





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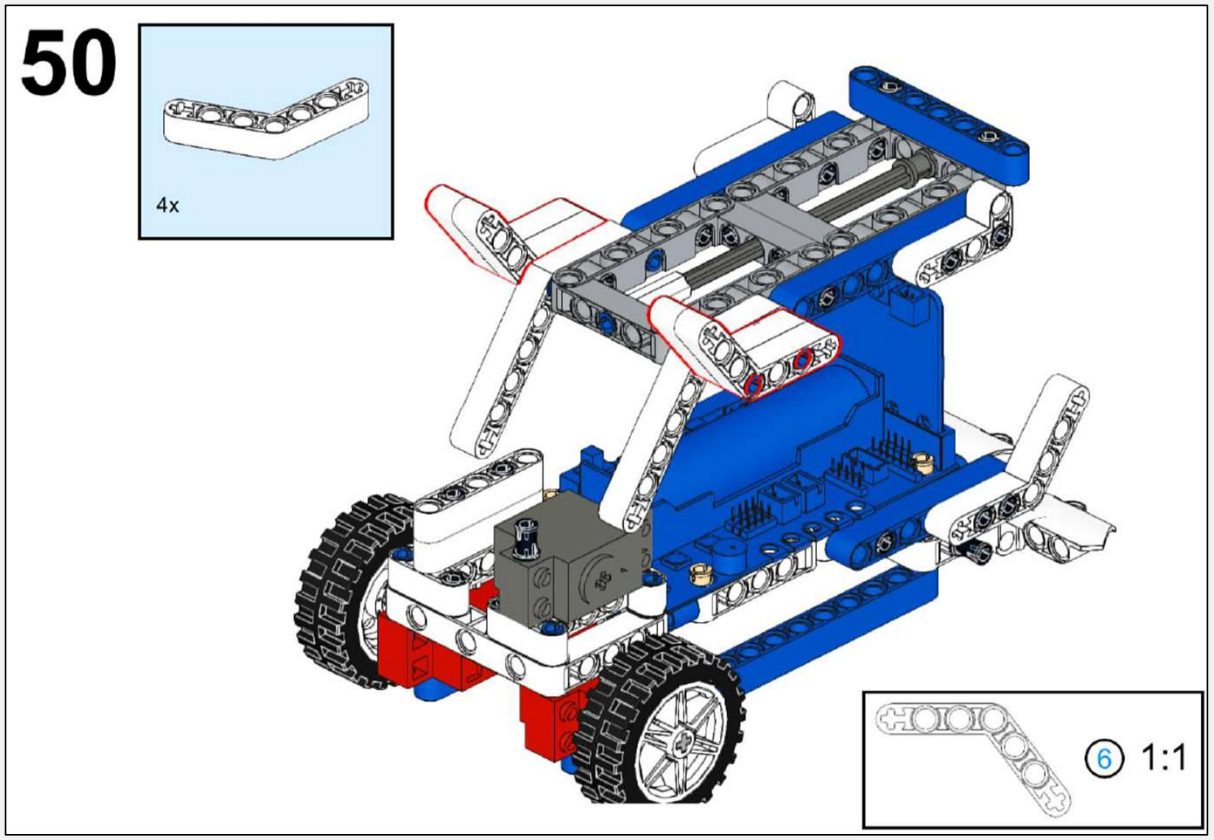
# Step 50





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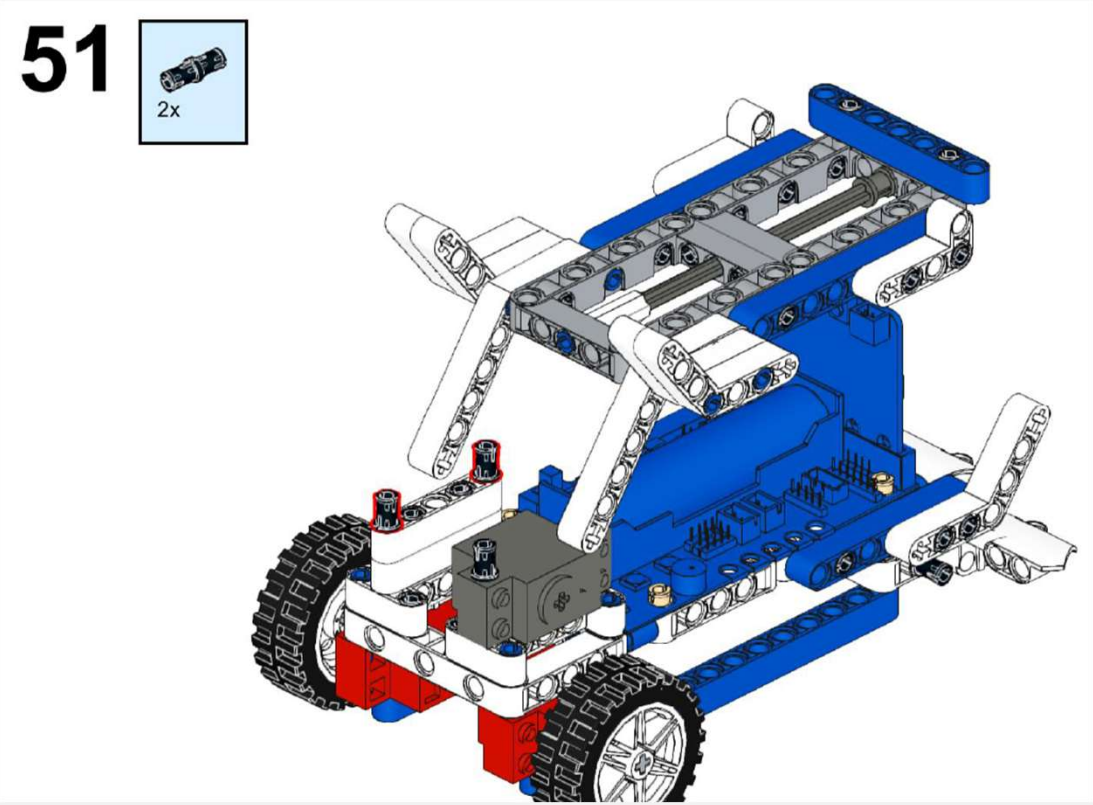
# Step 51





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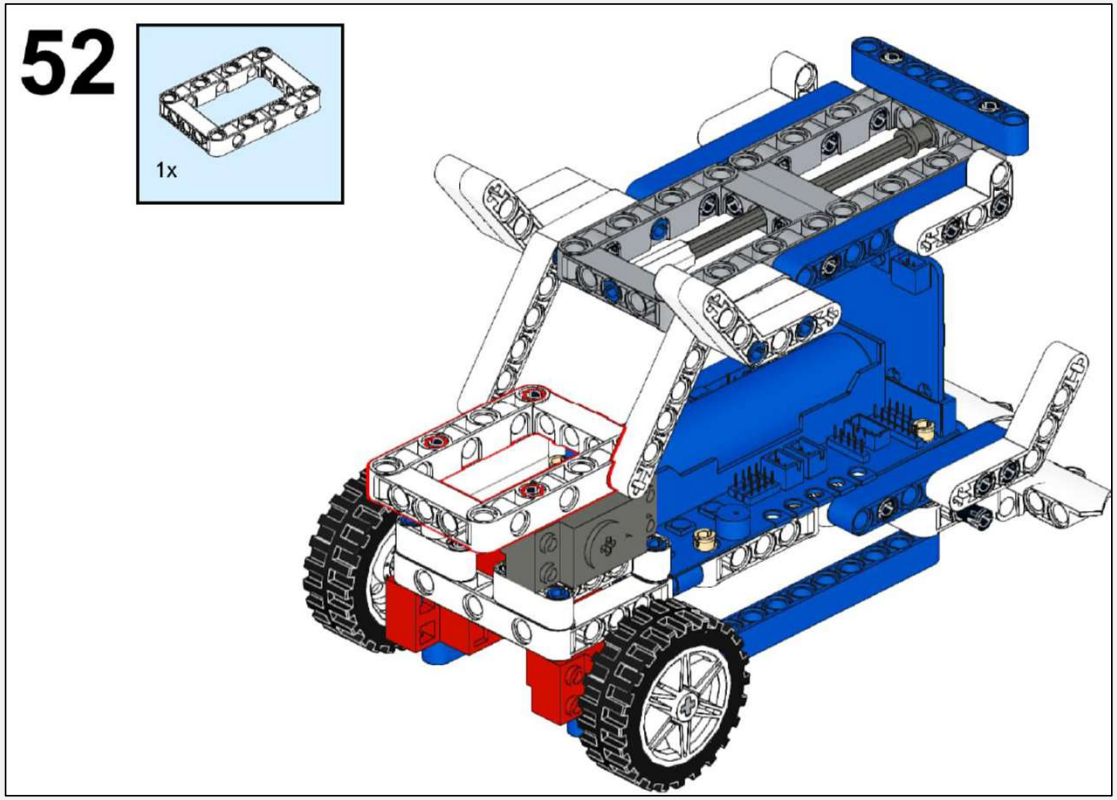
# Step 52





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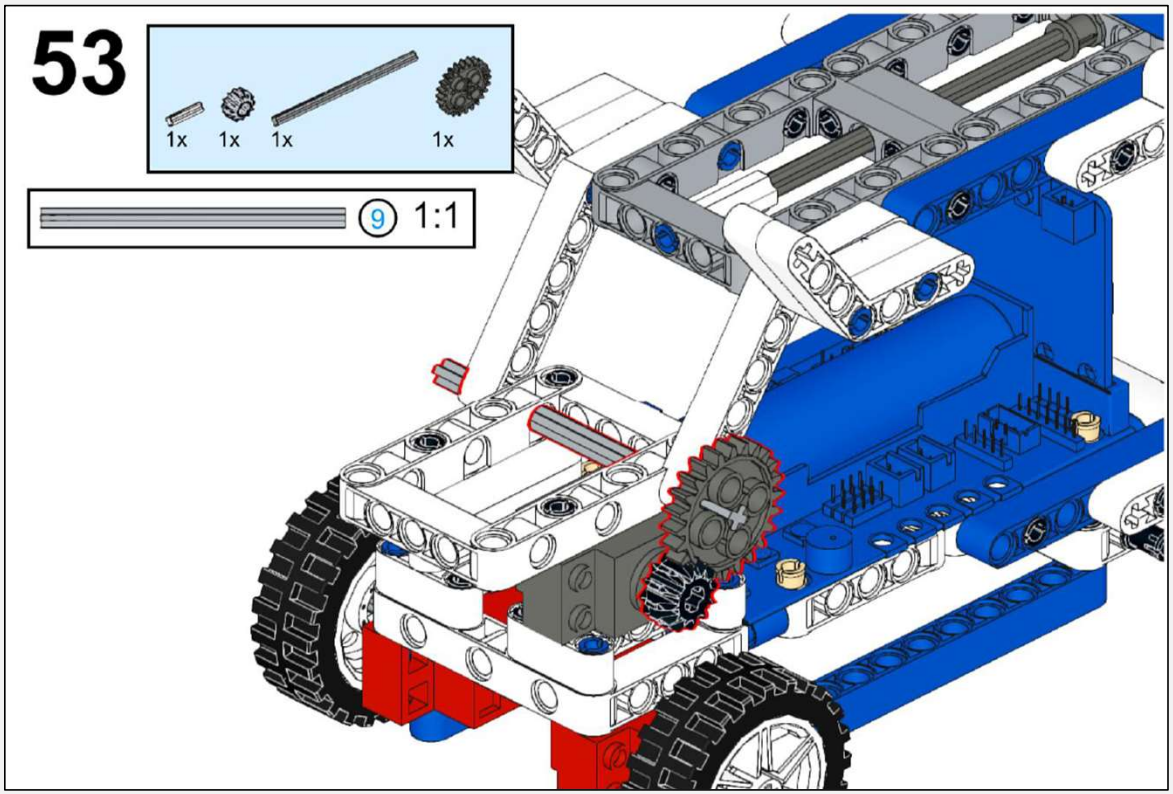
# Step 53





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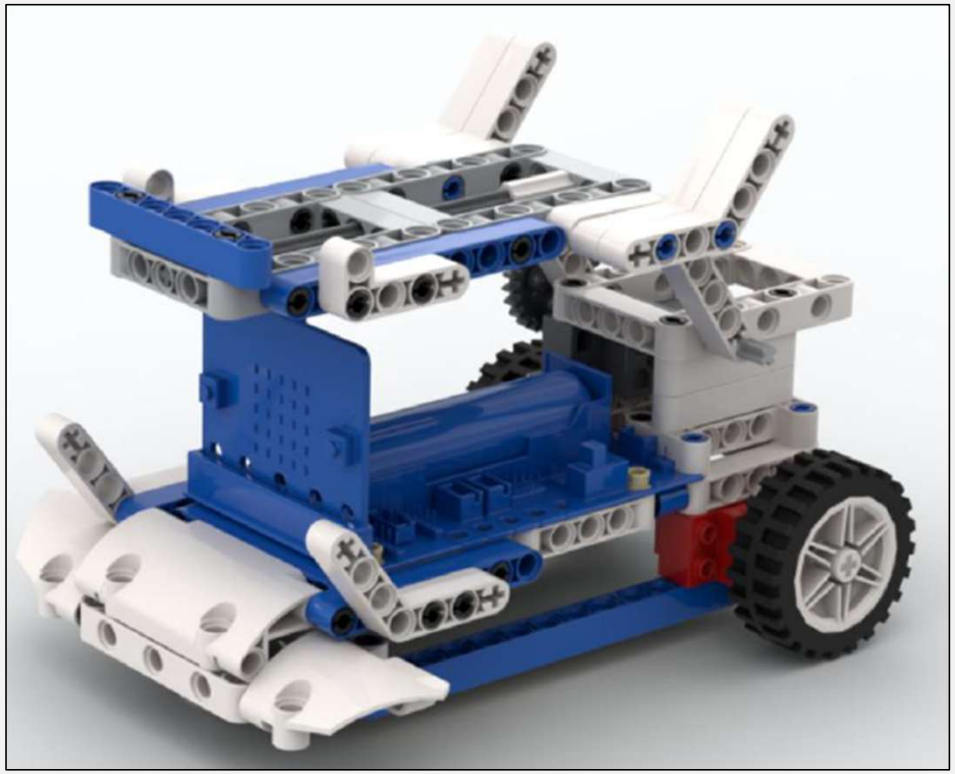
# Completed A Skip Car

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# Program your Skip Car


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# Code your Remote Controller


Remote Control


Let's program our remote controller first.

At first, we need to set radio group, please select a number from 0 – 255.

I will be using 1 as an example.

The radio group is served as a channel for your microbit to communicate via radio signal. So your **Skip Car** should be listening to the same channel to work.


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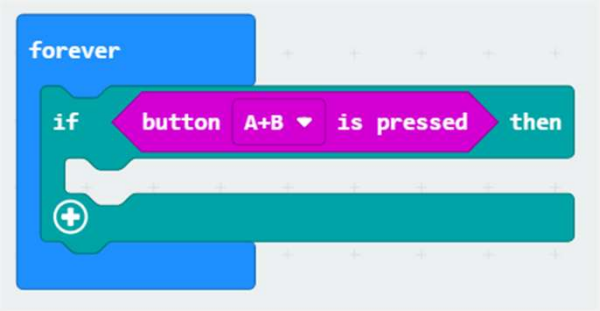
# Code your Remote Controller


Remote Control


Let's add a condition that when your button A and button B are pressed together, I will send a signal through radio to other microbit with the same group.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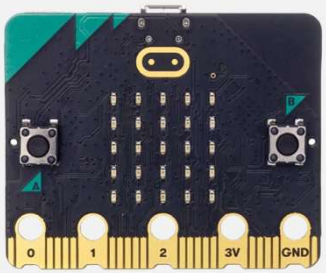
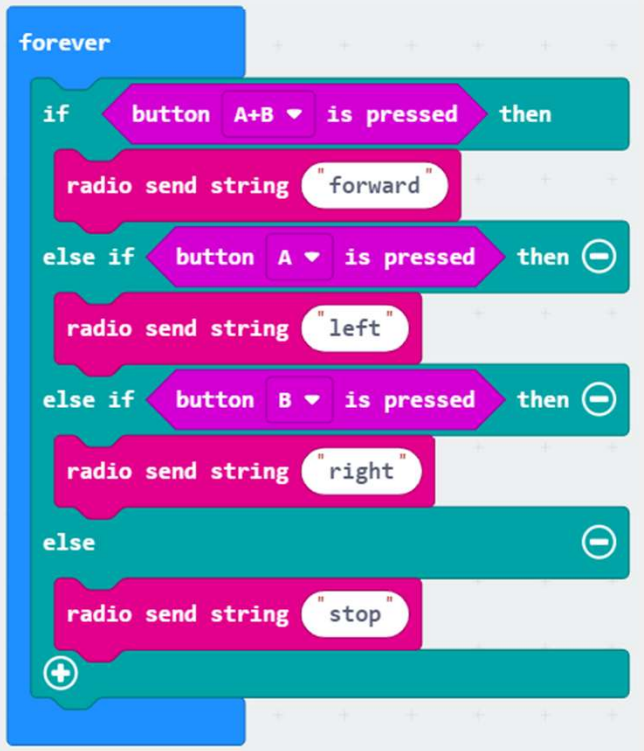
# Code your Remote Controller


Remote Control




Then we add in different trigger to send different strings.

Then your remote controller is done.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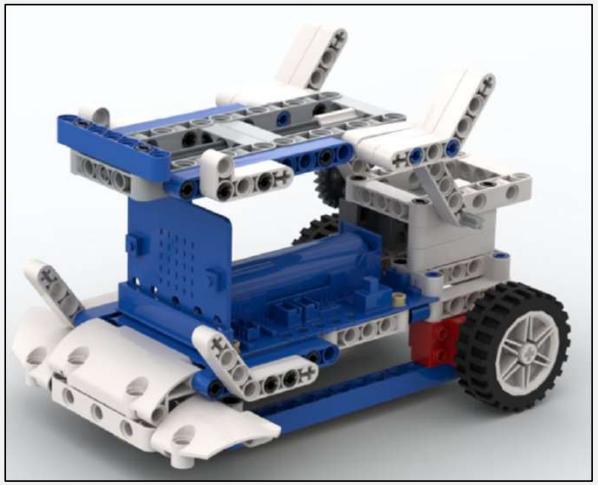
# Code your **Skip Car**



Skip Car

Now is the time to code your Skip Car to do action when receiving strings via radio from the remote controller.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# MakeCode Programming

First, we need to connect the micro:bit to the computer by USB cable. The computer will pop up a USB flash drive and click on the URL in the USB flash drive: http://microbit.org/ to enter the programming interface.

Add the Yahboom package https://github.com/lzty634158/SuperBit to program.

Or search lzty634158/SuperBit in the Microbit extension.


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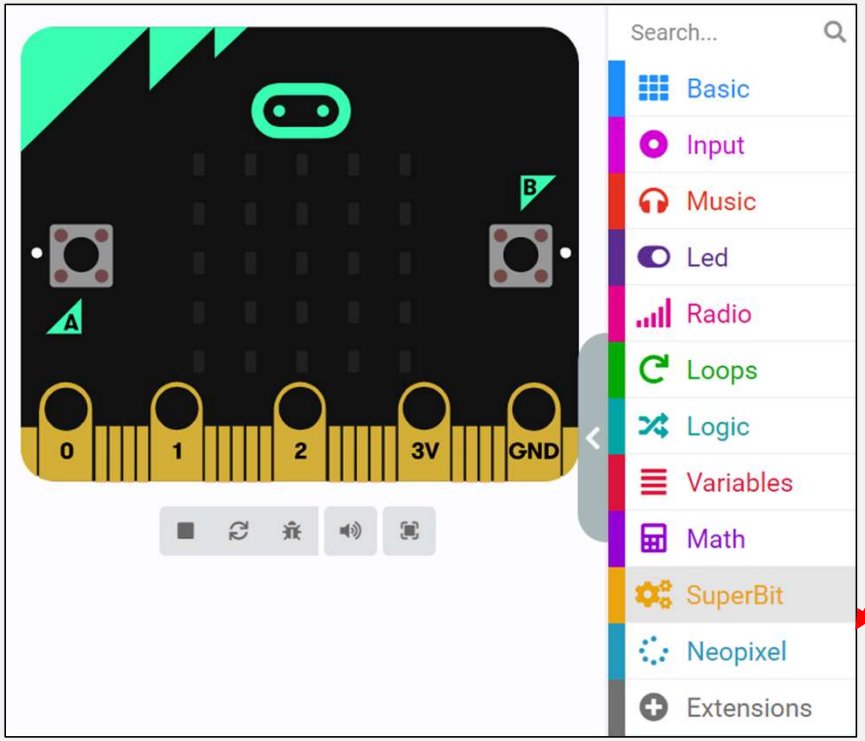
# Superbit Extension




After importing the superbit extension, you will see **SuperBit** and **Neopixel** in your coding blocks.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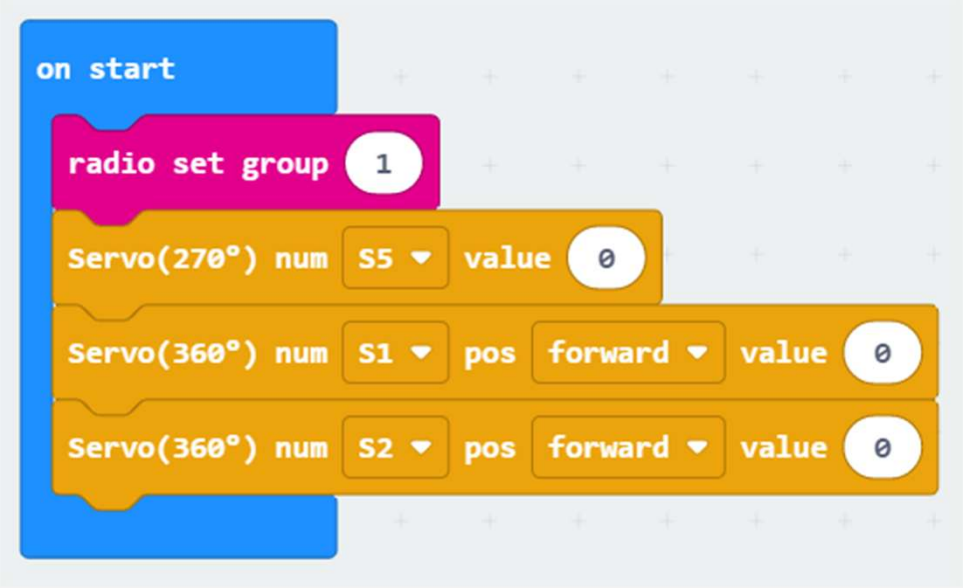
# MakeCode Programming




Program our starting state of our servos. And also set the radio group to the group that you set on your remote controller.

**You can use your last lesson's program.

**We just need to add the actions for received signals from the remote controller.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# Make a Function - Move Forward


To make our program easy, we better make functions for our move forward, turn right, turn left and move backward as well as shovelling.

Let's start with Move Forward.

**You can use your last lesson's program.

**We just need to add the actions for received signals from the remote controller.


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# Make a Function





**You can use your last lesson's program.

**We just need to add the actions for received signals from the remote controller.

Let's program for the remaining functions.


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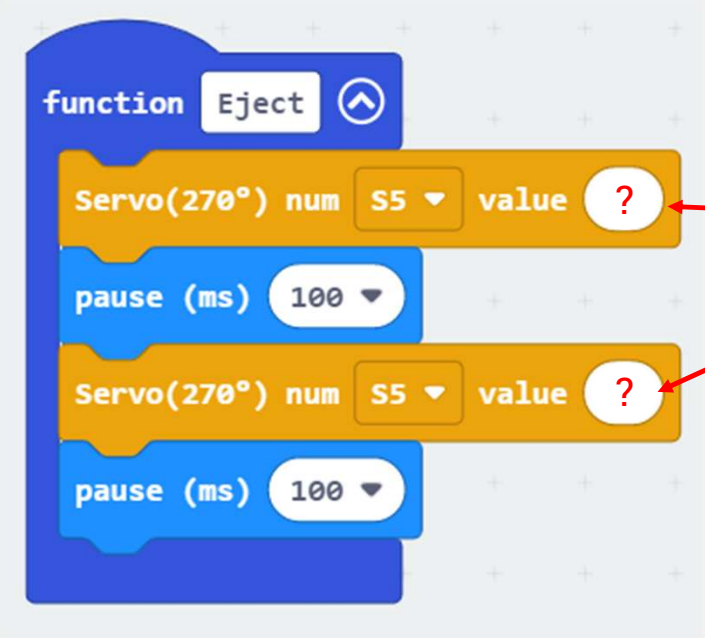
# Make a Function – Eject




To make an eject function, test your 270° servo with different value to make it turn the handle in and out.

But you must make sure your servo is calibrated and not be overturned.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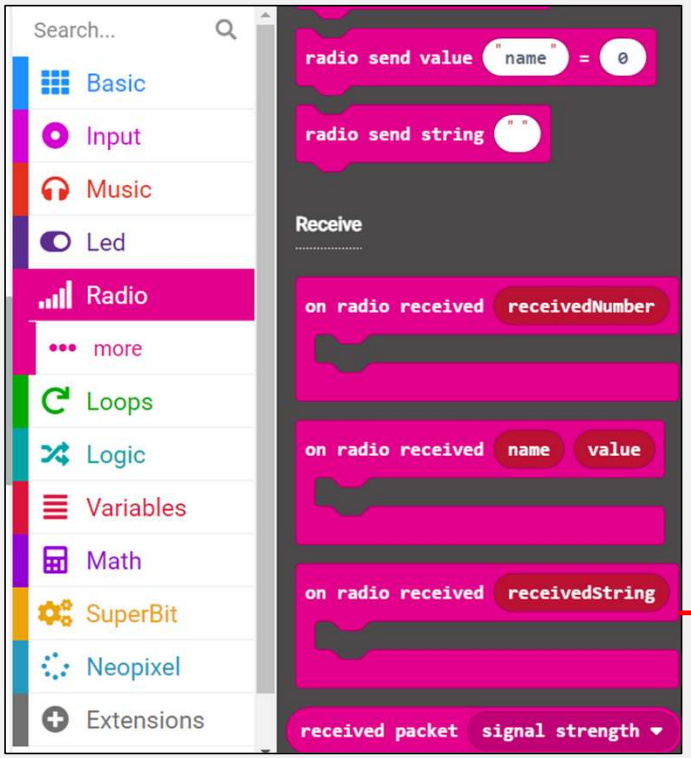
# Code your Skip Car's actions





Let's take the block "**on radio received '**receivedString**'**" for the actions when received the signals from other microbit.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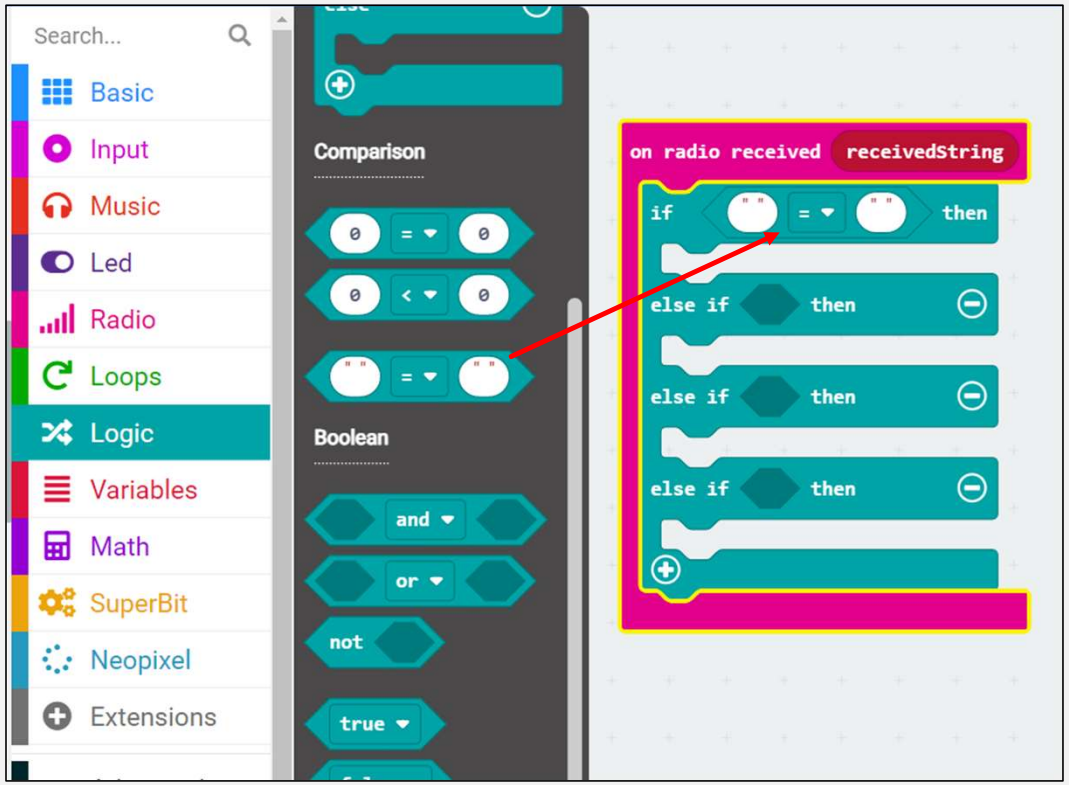
# Code your Skip Car's actions




Since we got 4 possible strings received from our controller, we need to set **4 conditions** inside.

As now we are comparing the string, not the number, make sure your comparison operator is using the **string comparison** with the quotation mark (“”).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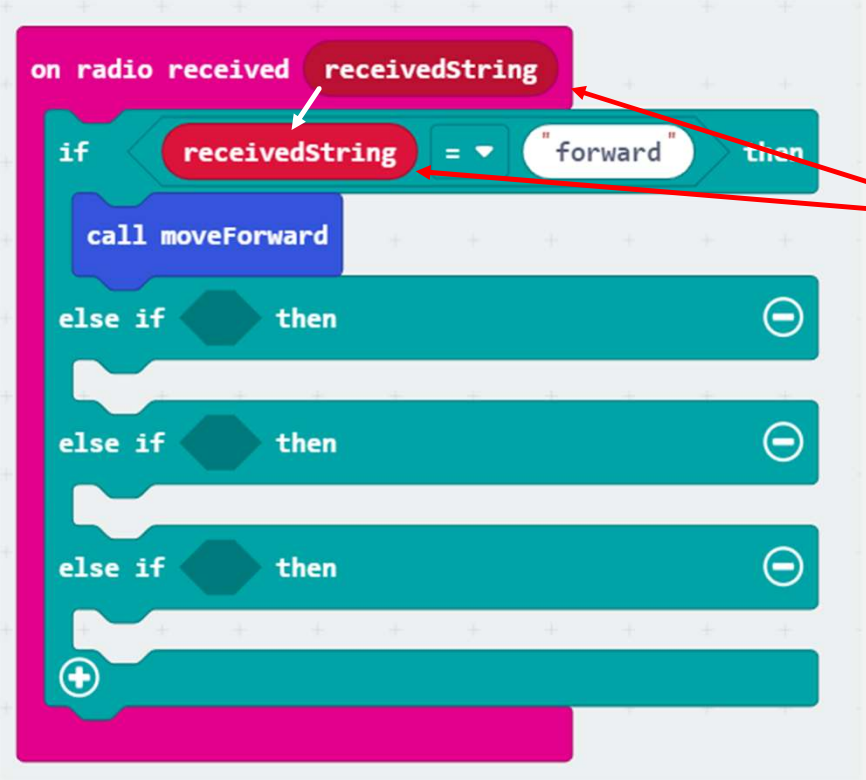
# Code your Skip Car's actions




We will need to check what string is received and set if the string received is "**forward**", then we want to call the **moveForward** function.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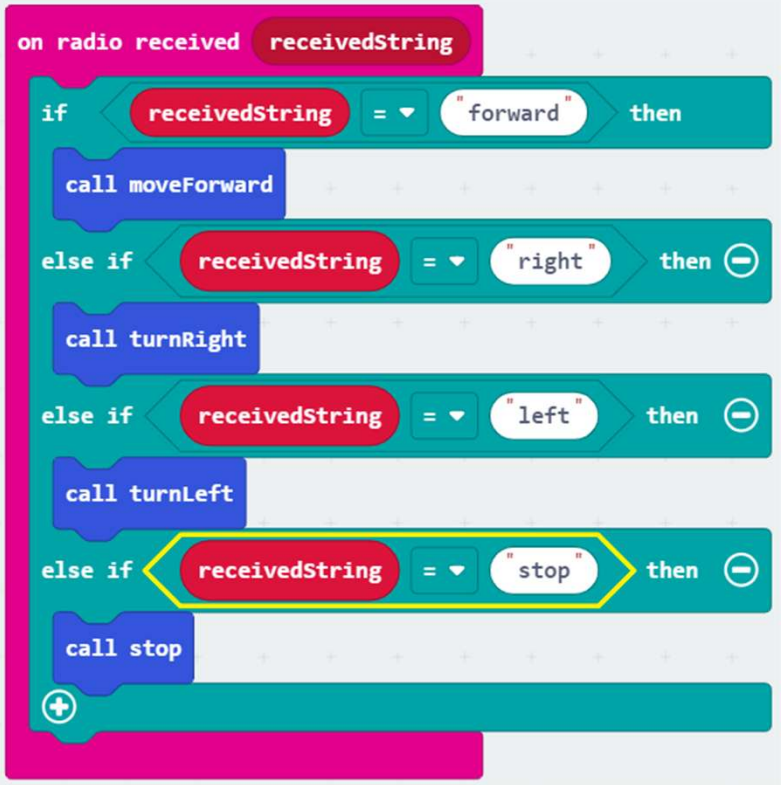
# Code your Skip Car's actions




Complete the actions for remaining functions.

Please make sure the strings must be totally same (case sensitive) from the strings that you program with your remote controller.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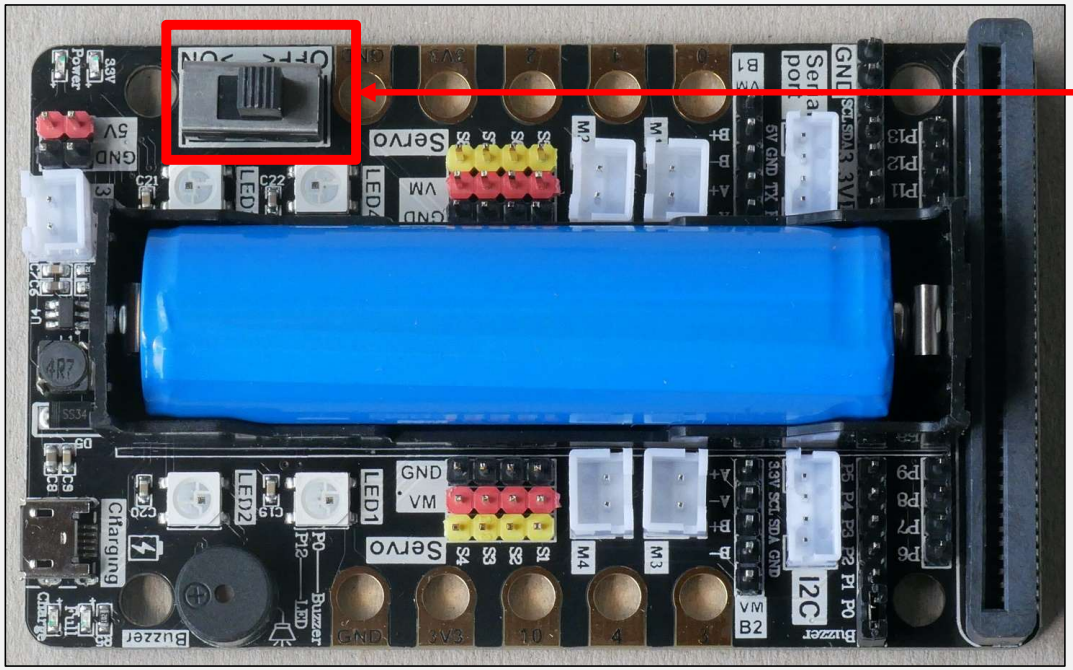
# MakeCode Programming




After the program is downloaded, turn on the SuperBit with the power switch to turn on your **Skip Car**.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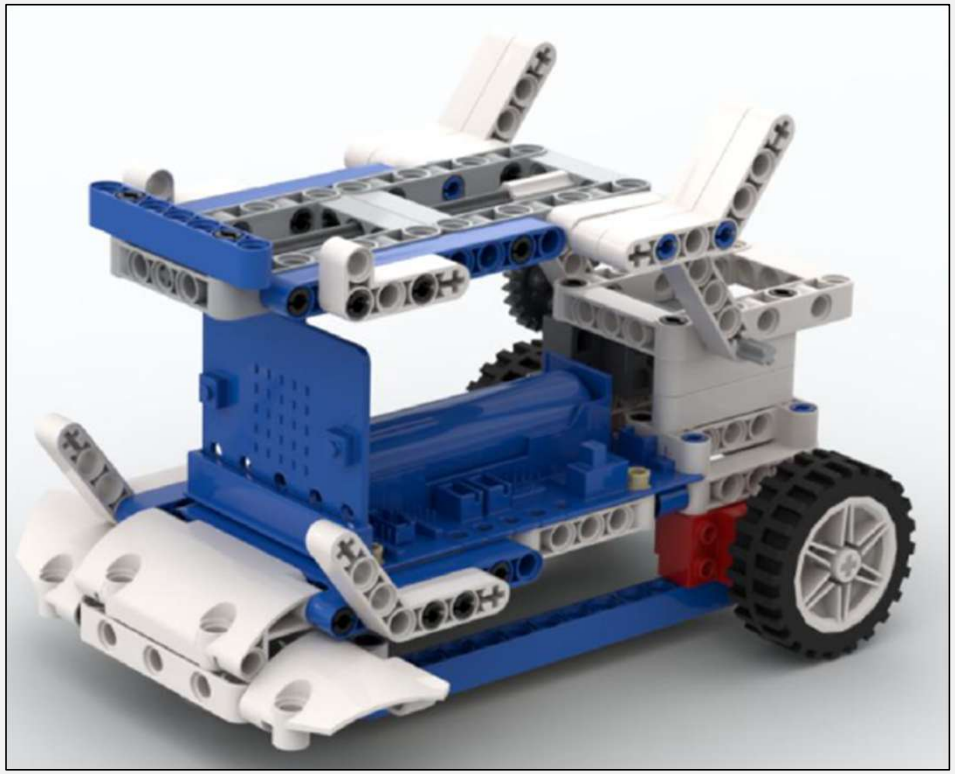
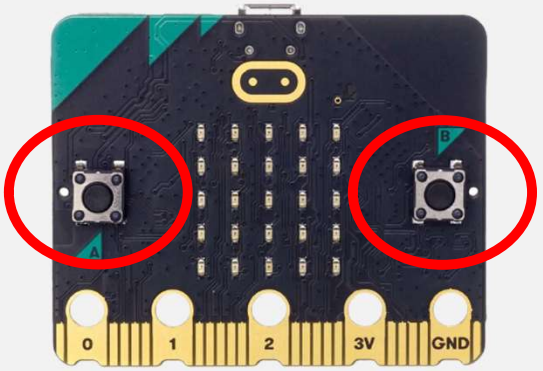
# Phenomenon

30 Points






Connect your remote controller to your laptop to power on and try to interact with the button A & button B, then observe what happen to your **Skip Car**. You now should be able to control your **Skip Car** with forward, left and right.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# CHALLENGE
# for : Lesson 5


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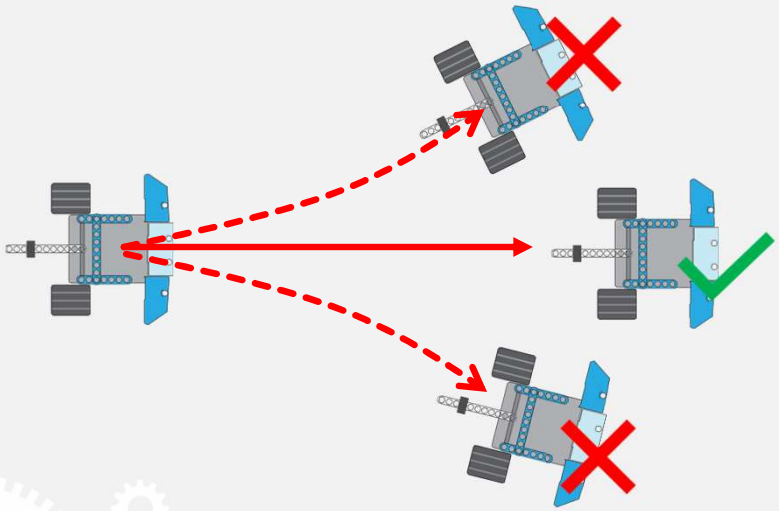
# L5 – Challenge 1



Program your Proficient Carrier to have full movement functions:

1. Move Forward (Tune it to be straight)
2. Turn Right
3. Turn Left
4. Move Backward (Tune it to be straight)

**30 Points**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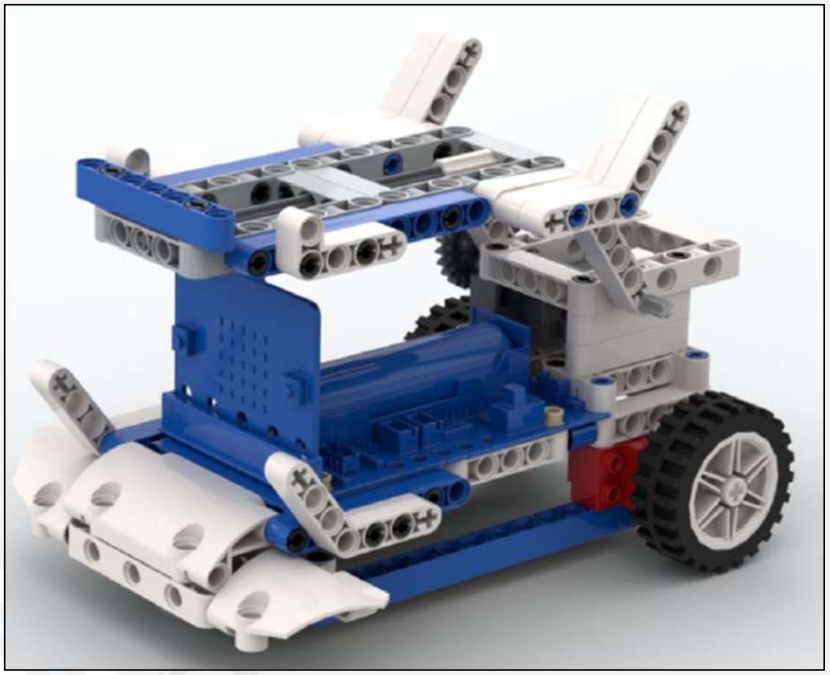
# L5 – Challenge 2



Add the eject function for your proficient carrier.

You may need to adjust your robot handle and calibrate your servo motor before you start coding.

**Go to your input coding blocks and see what are the inputs can be used as a trigger.

**30 Points**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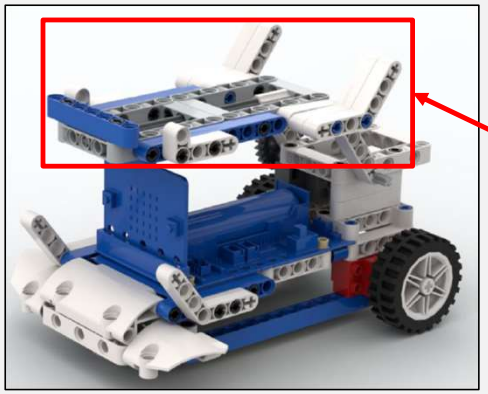
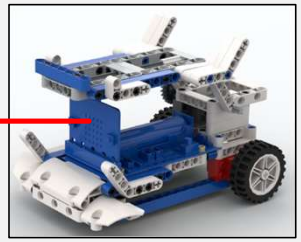
# L5 – Challenge 3





Modify your skip car's handle to make sure the bricks carrier won't fall from it.

And then carrier some bricks and send the bricks to the destination, then eject the bricks to the destination.

Repeat this process to send 3 piles of bricks to the destination.

**30 Points**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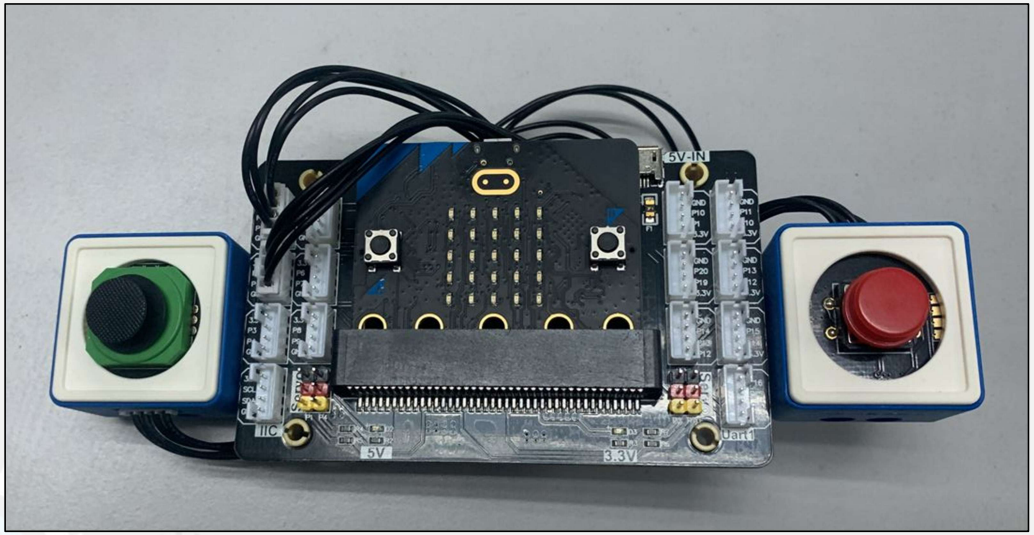
# L5 – Mission




**Can you use WOM modules as a controller and add in button as for grab function, and the rocker module as the movement control for the skip car?**

**50 Points**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