pi-top [4]

ROBOTICS KIT

ALEX

Build Instructions

What can Alex do?

Alex is a configuration designed for autonomous driving and AI projects.
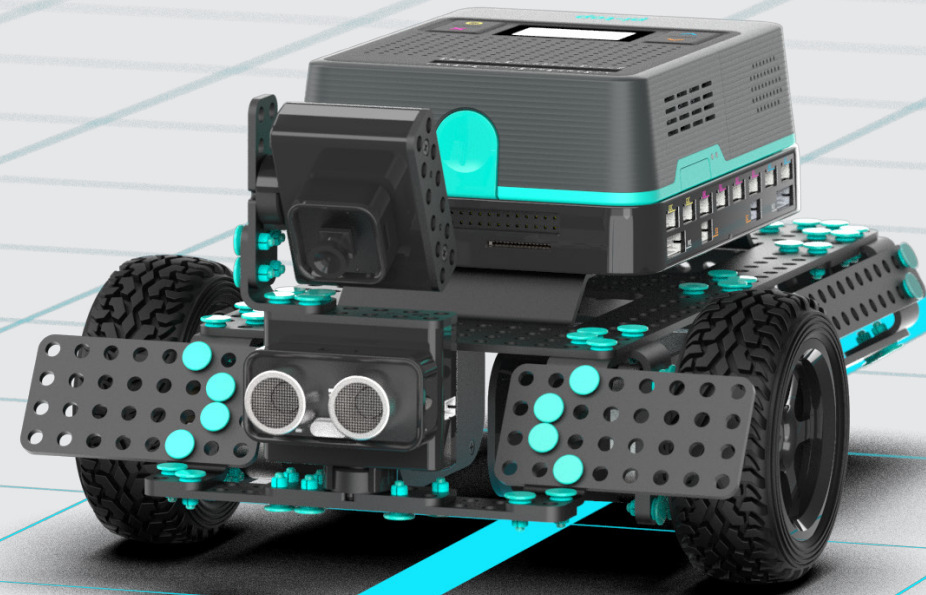
It incorporates a Pan-tilt Servo Motor mechanism mounted on the front which gives the wide-angle camera sensor two degrees of freedom - a full 180° of range in both axes. Its Ultrasonic Sensor is also attached to the Pan-Tilt Servo Motor mechanism which enables Alex to perform full 180° scans to look for possible obstacles. Finally, the two high accuracy, high power Encoder Motors are positioned at the front of the vehicle; allowing for more accurate positioning for projects such as line-following.

The pi-top [4] Robotics Kit offers ultimate modularity and expandability, allowing you to customise or design any configuration to suit your needs. Alex provides a large range of sensor mounting points so you can adapt and change it rapidly to suit the needs of your projects.

Need help?
pi-top.com
/support

Contents

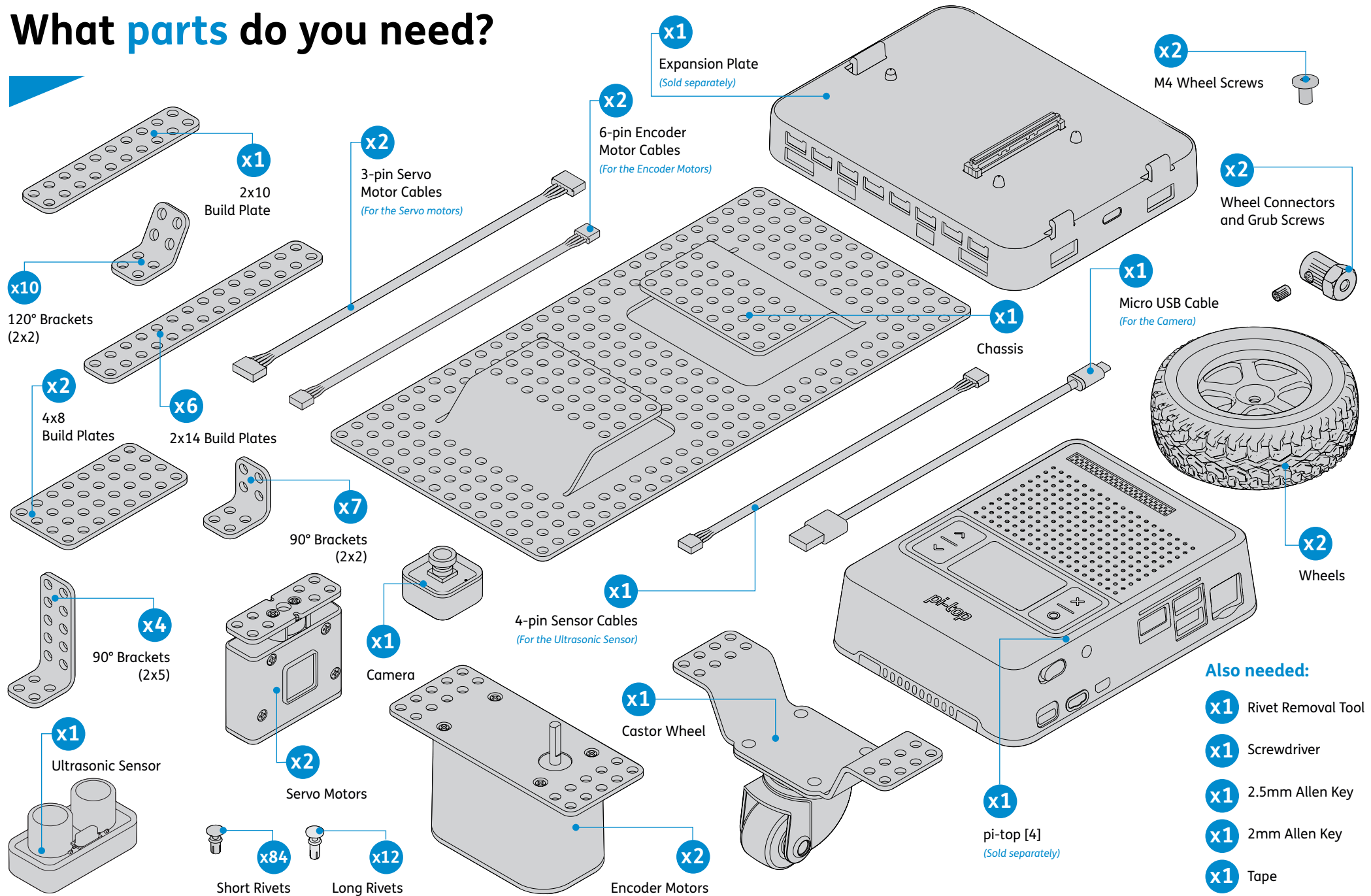# What parts do you need?

x1 Expansion Plate
(Sold separately)

x2 M4 Wheel Screws

x1 2x10 Build Plate

x2 3-pin Servo Motor Cables
(For the Servo motors)

x2 6-pin Encoder Motor Cables
(For the Encoder Motors)

x2 Wheel Connectors and Grub Screws

x10 120° Brackets (2x2)

x1 Micro USB Cable
(For the Camera)

x1 Chassis

x2 4x8 Build Plates

x6 2x14 Build Plates

x2 Wheels

x7 90° Brackets (2x2)

x1 Camera

x1 4-pin Sensor Cables
(For the Ultrasonic Sensor)

x4 90° Brackets (2x5)

x1 Ultrasonic Sensor

x2 Servo Motors

x1 Castor Wheel

x1 pi-top [4]
(Sold separately)

x84 Short Rivets

x12 Long Rivets

x2 Encoder Motors

Also needed:

x1 Rivet Removal Tool

x1 Screwdriver

x1 2.5mm Allen Key

x1 2mm Allen Key

x1 Tape

How to use the rivets

The Robotics Kit contains **two types of rivet:**
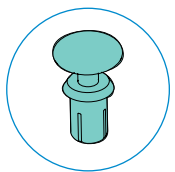
Short Rivets
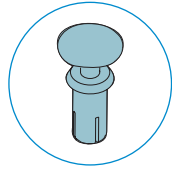
Long Rivets

Connecting 2 Build Plates

Short Rivets
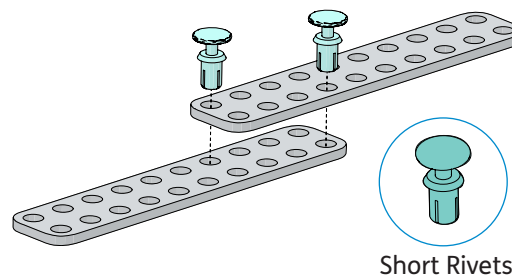
1.

2.

3.

4.

Connecting 3 Build Plates

Long Rivets
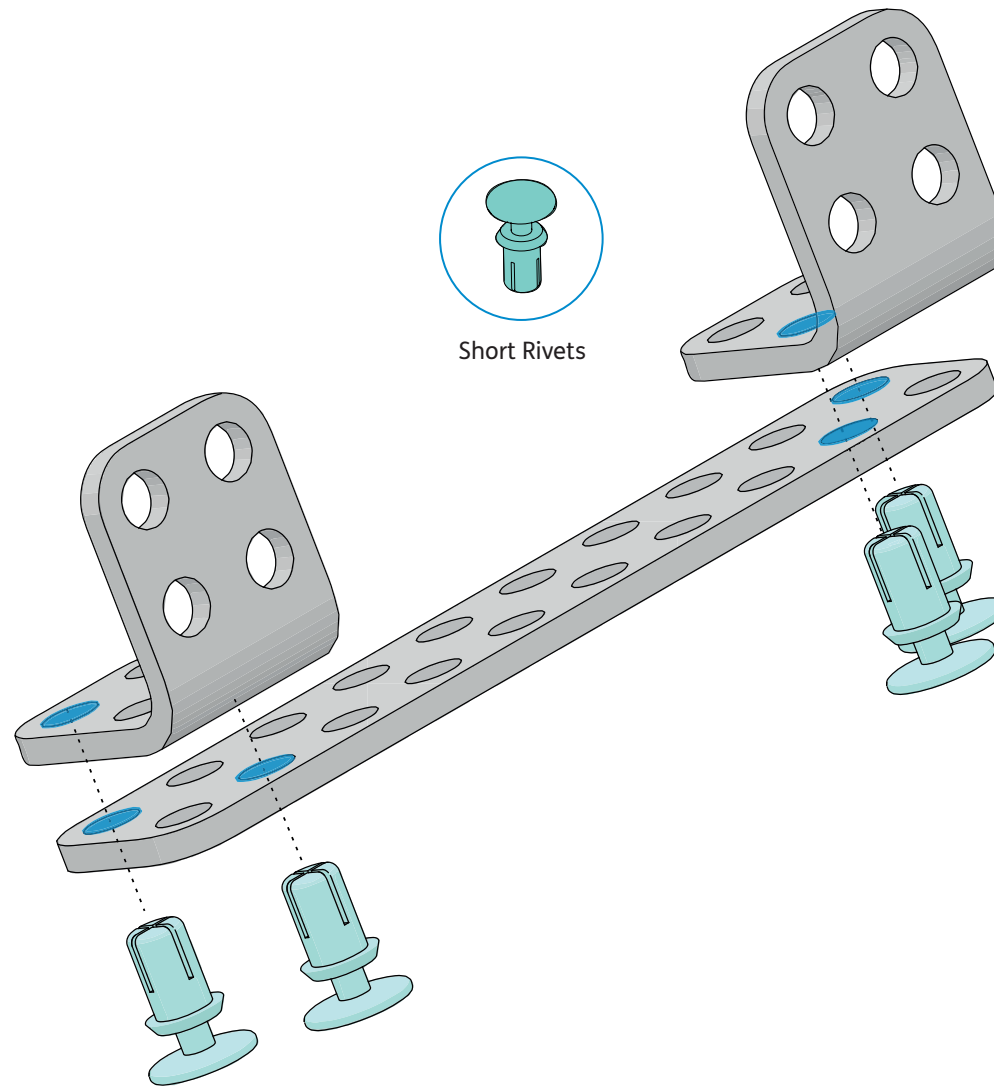
1.

2.

3.

4.

Build guide

Rear bumper

Part 1

x2

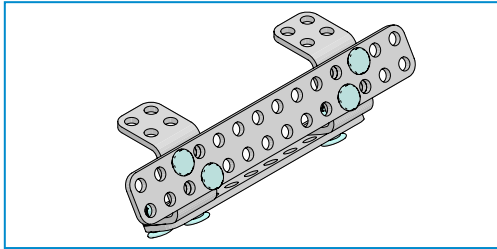90° Brackets
(2x2)
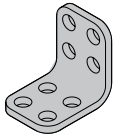
x1

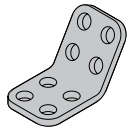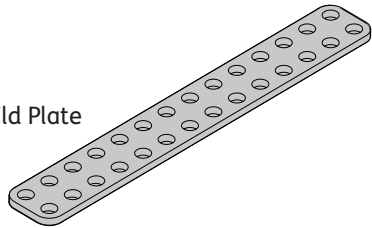10x2 Build Plate
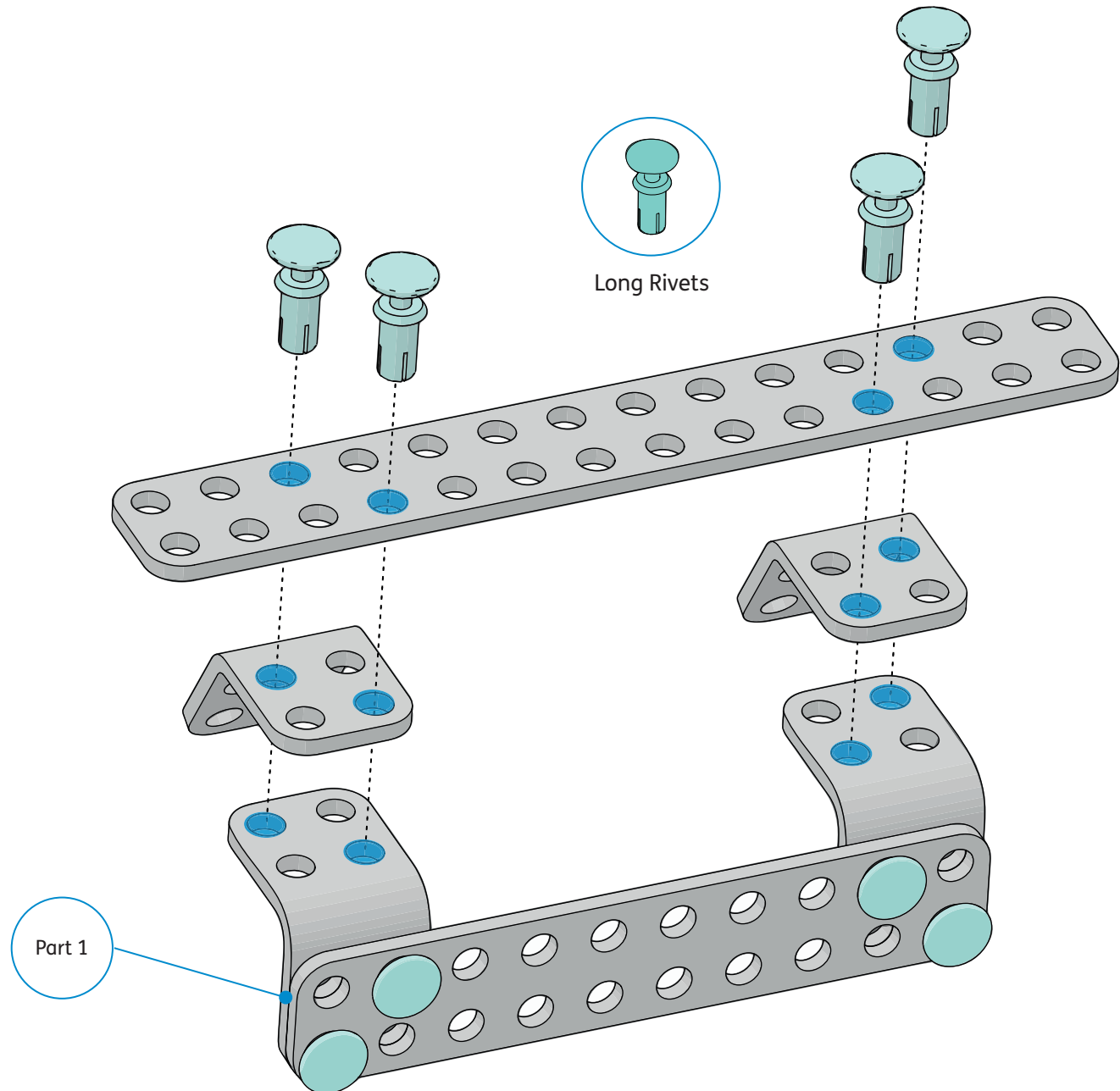
x4
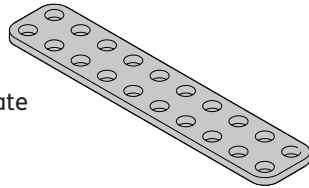
Short Rivets
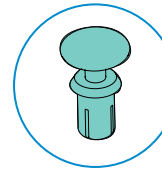
Short Rivets

Rear bumper

Part 2

x2
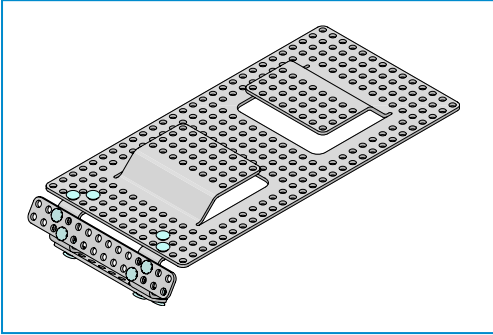
120° Brackets
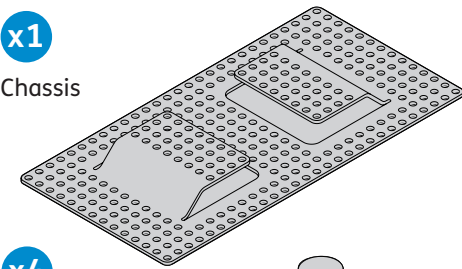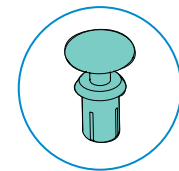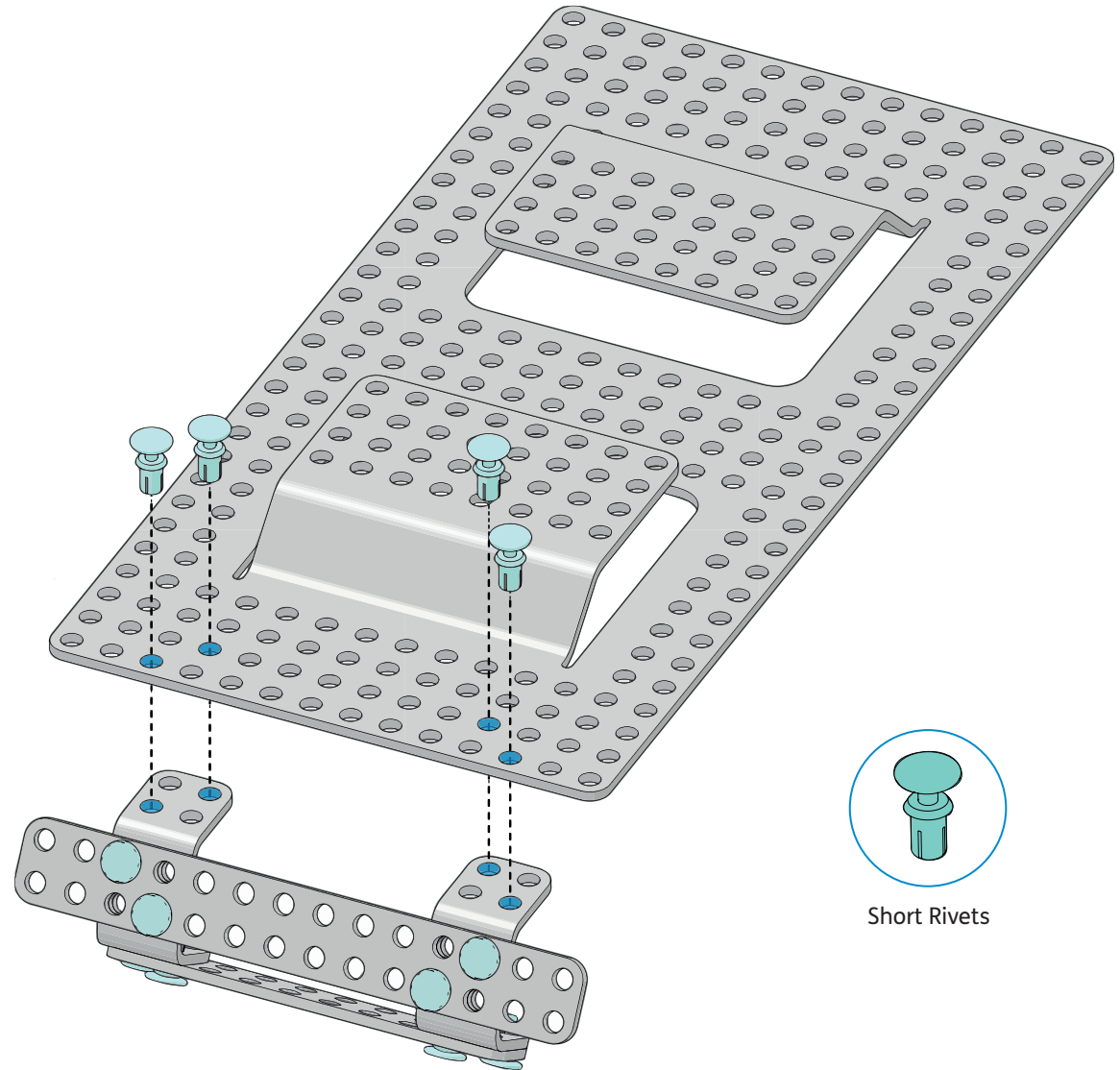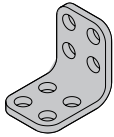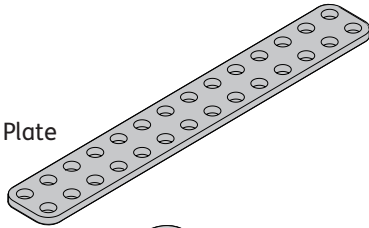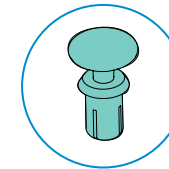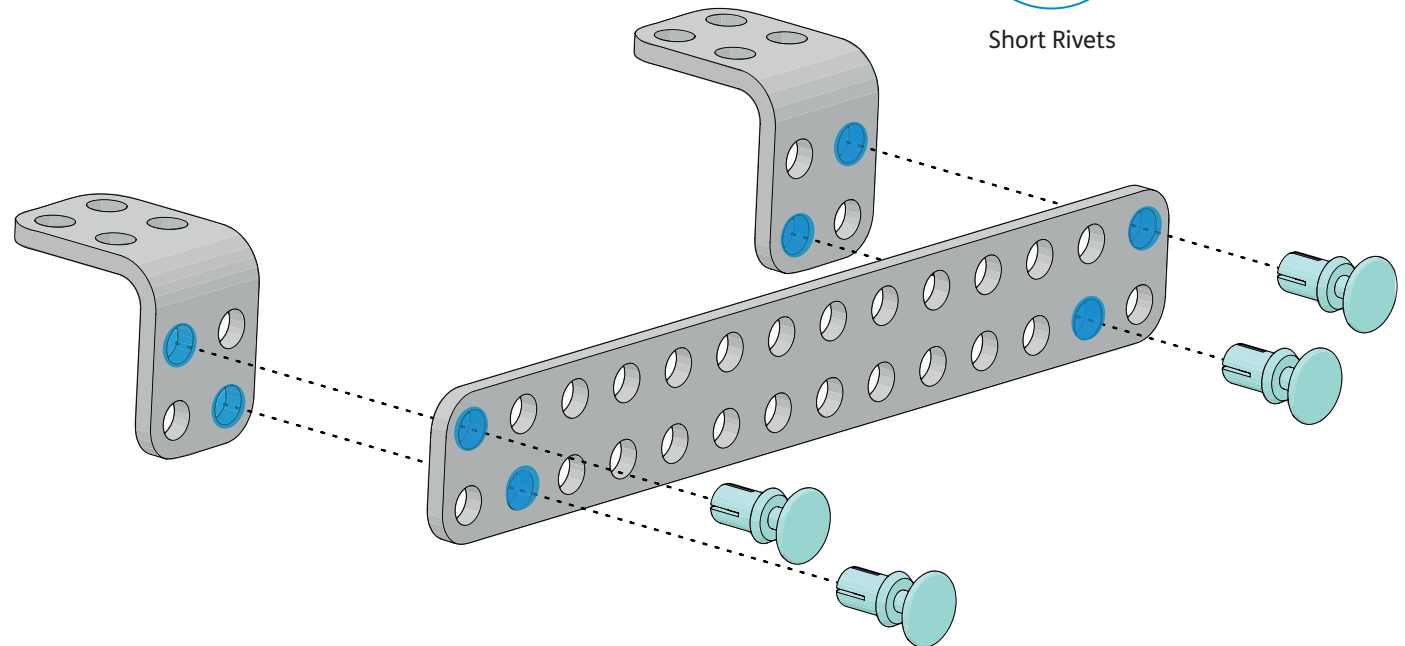(2x2)

x1

2x14 Build Plate

x4

Long Rivets

Long Rivets

Part 1

Chassis

x1
Chassis

x4
Short Rivets

Short Rivets

Castor wheel
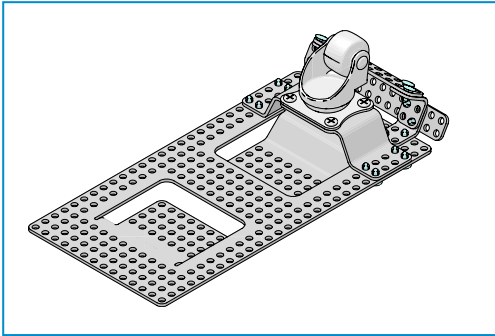
x1
Castor Wheel

x8
Short Rivets
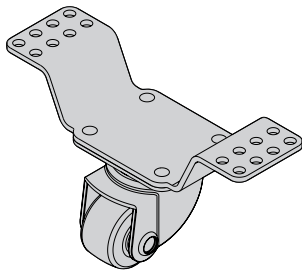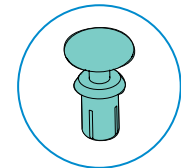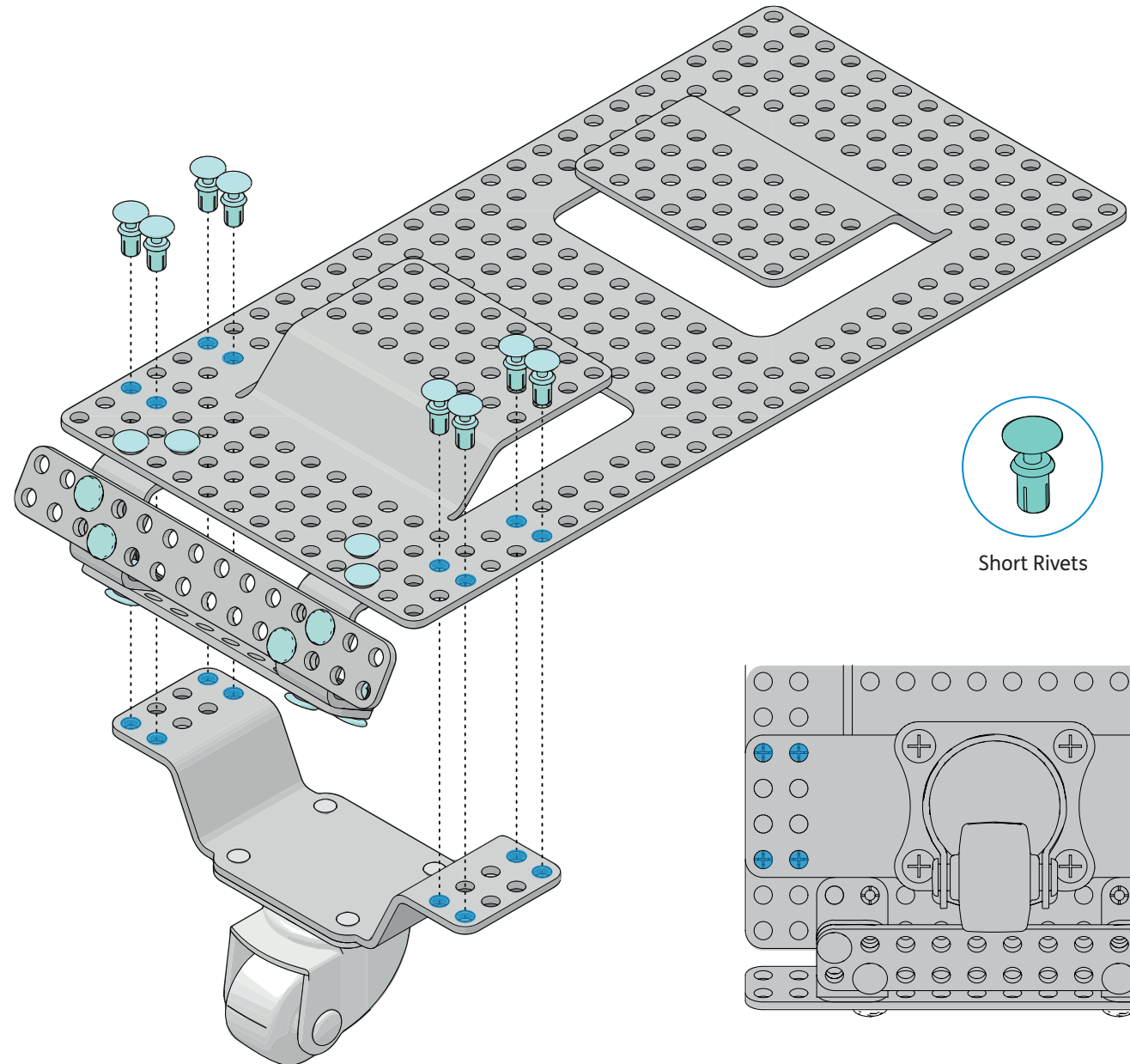
Short Rivets
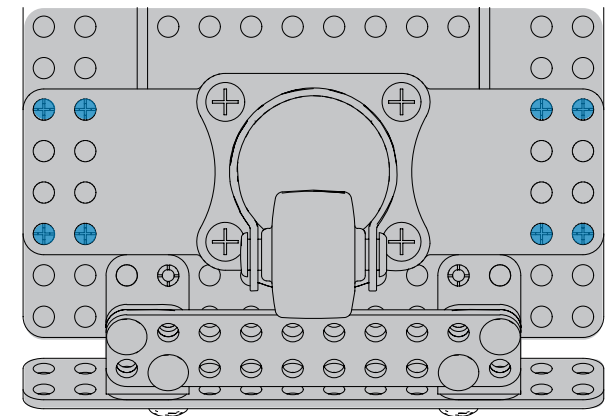
Side bumpers

Part 1

x2
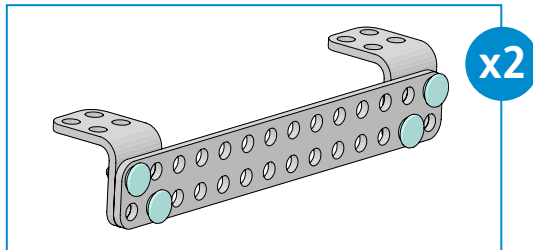
x2
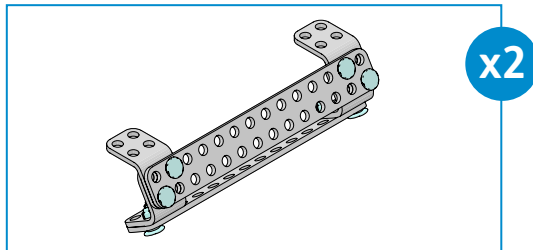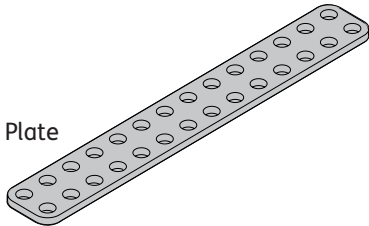90° Brackets
(2x2)

x1
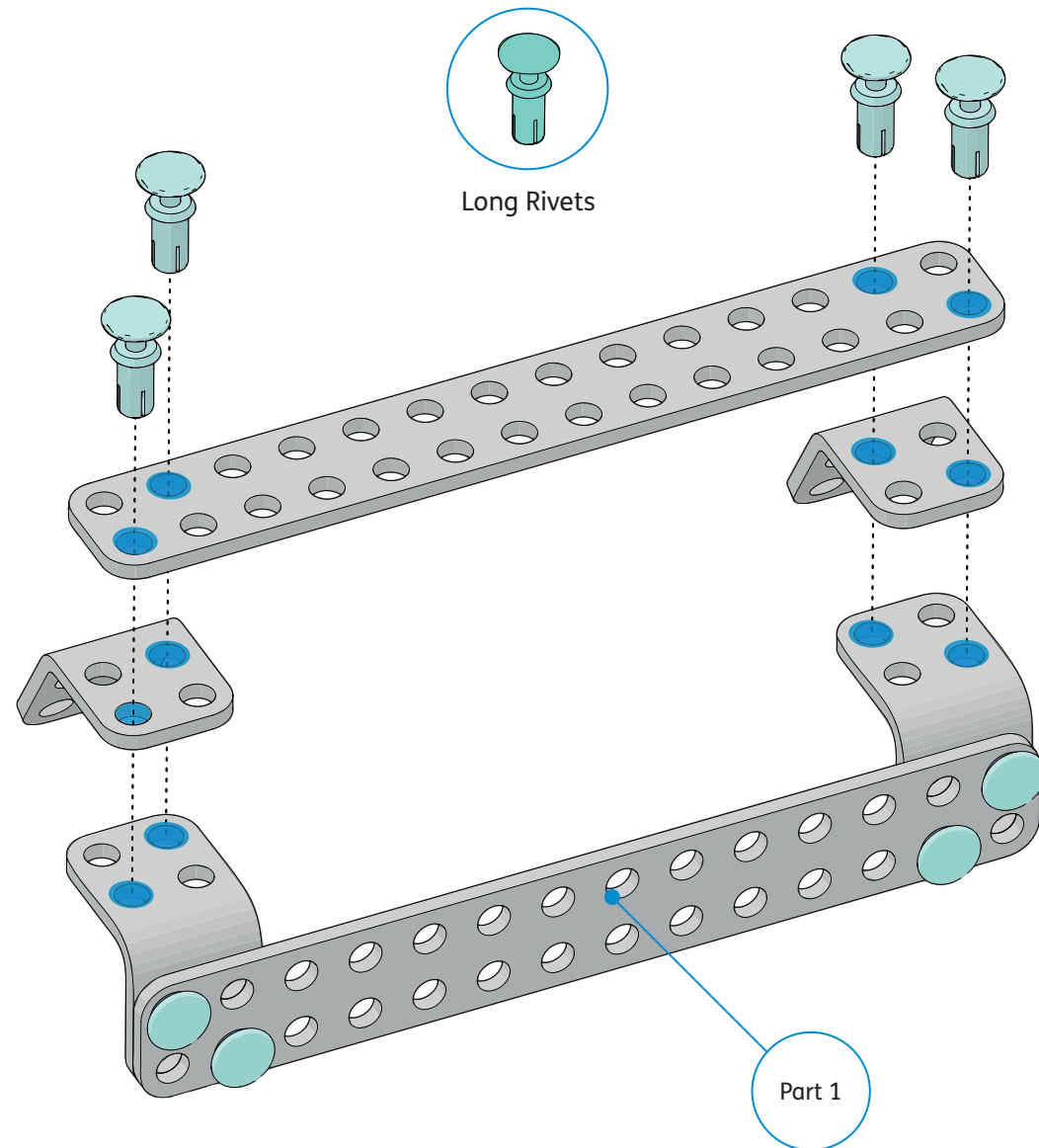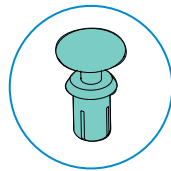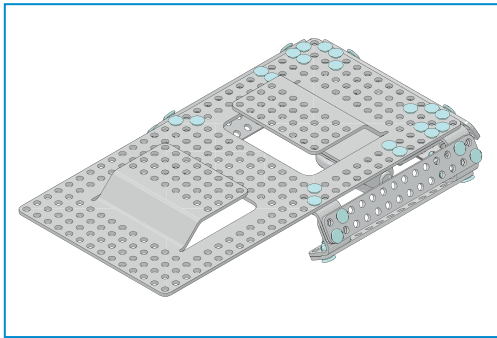2x14 Build Plate

x4
Short Rivets

Short Rivets

Side bumpers

Part 2

x2

x2
120° Brackets
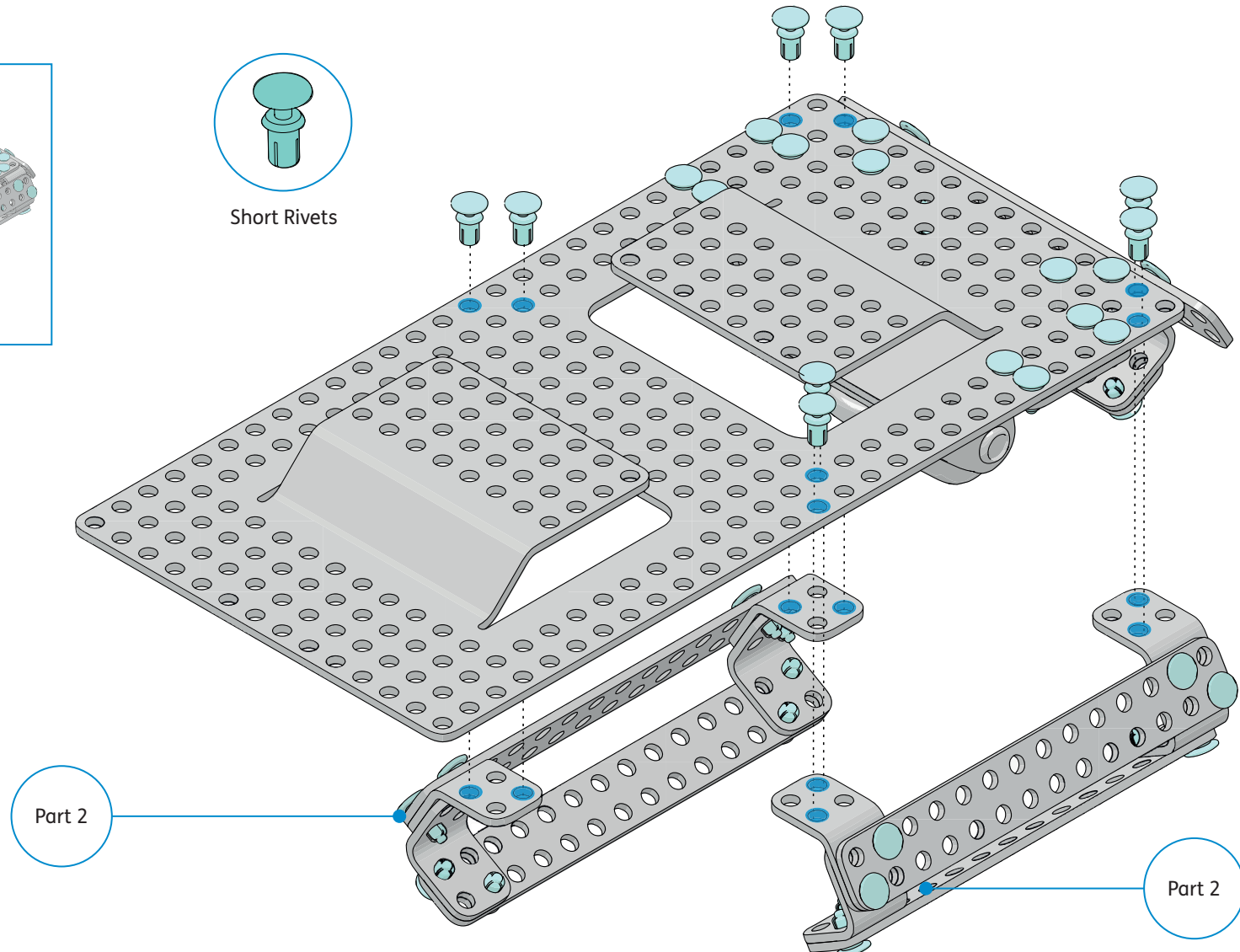(2x2)

x1
2x14 Build Plate

x4
Long Rivets

Long Rivets

Part 1

Side bumpers
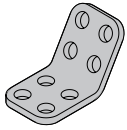
Part 3

x8
Short Rivets

Short Rivets

Part 2

Part 2

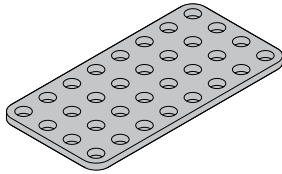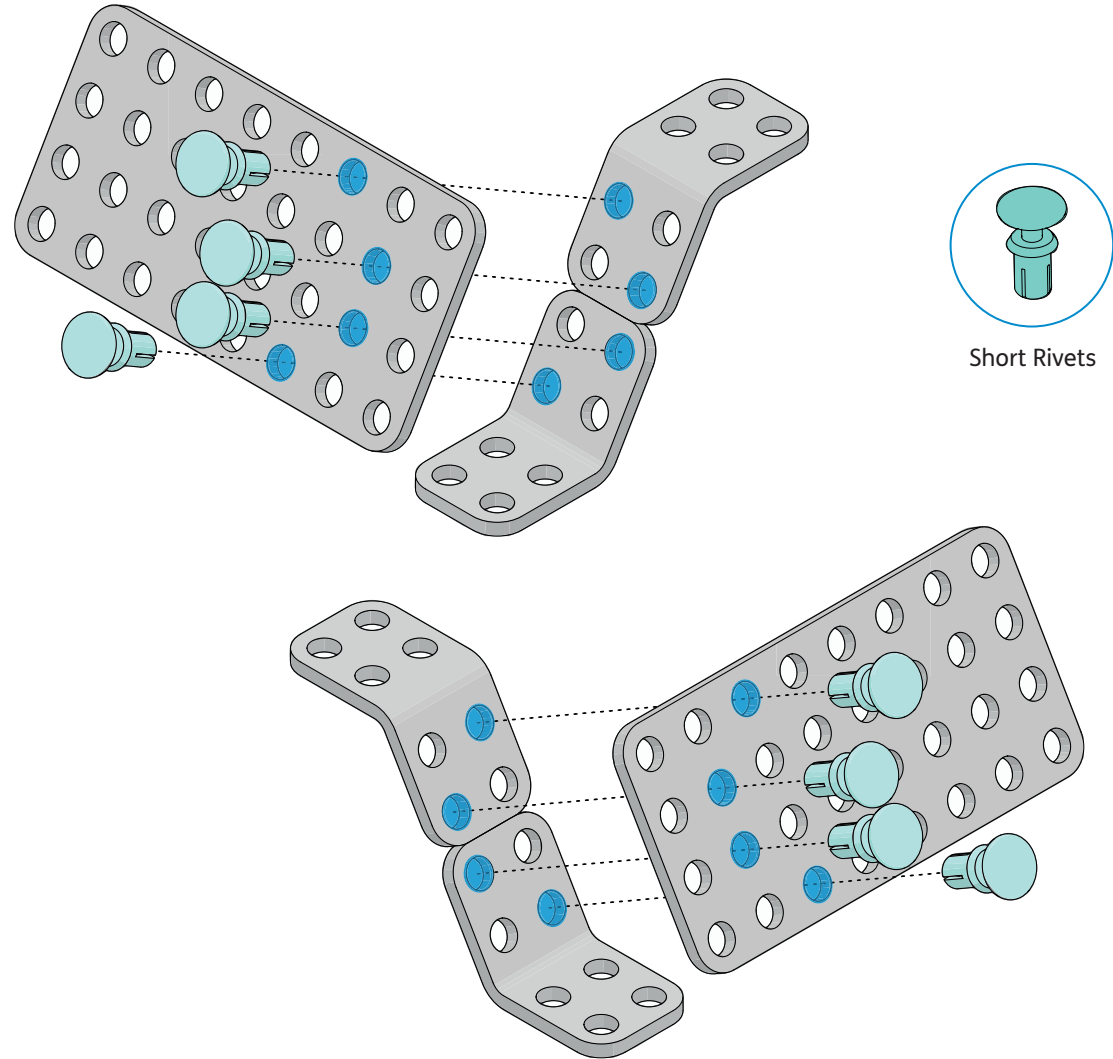# Front bumper

Part 1

x4

120° Brackets
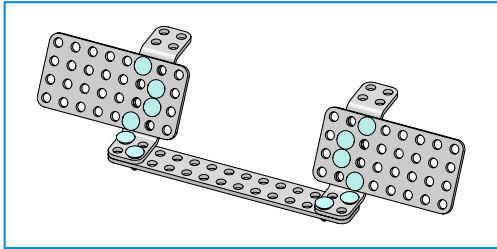(2x2)

x2

4x8 Build Plate

x8

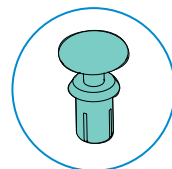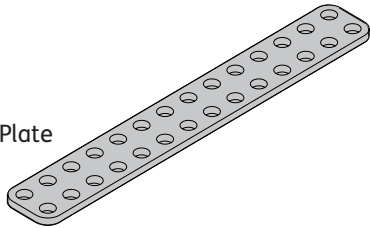Short Rivets

Short Rivets
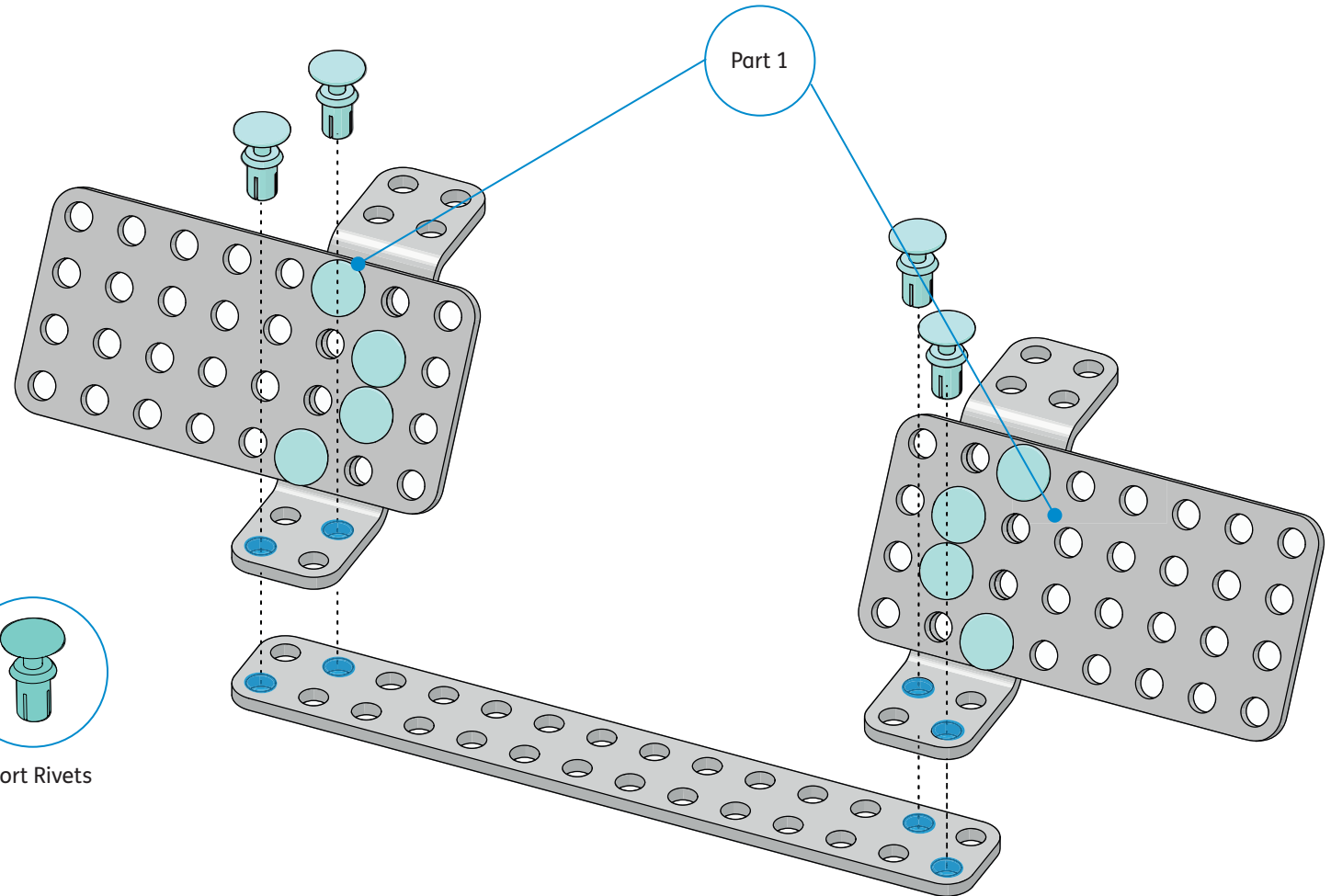
Front **bumper**
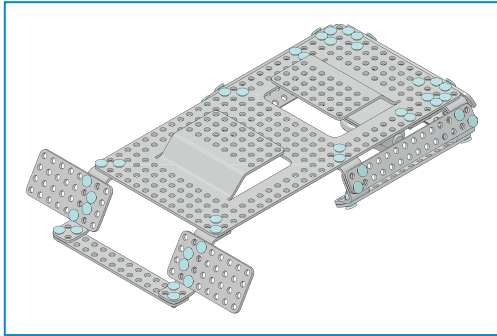
Part 2

x4

Short Rivets
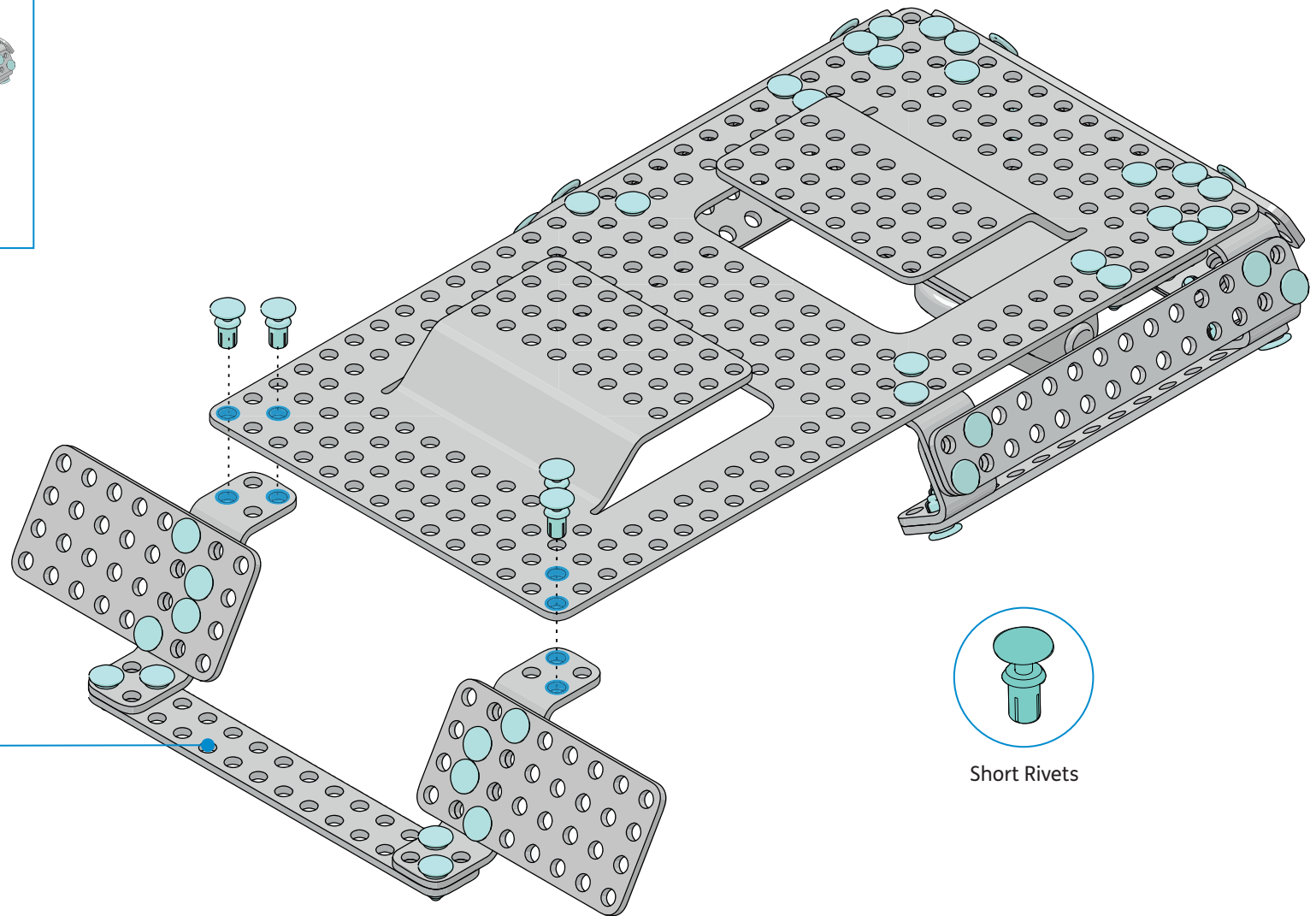
x1

2x14 Build Plate

Short Rivets

Part 1

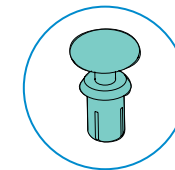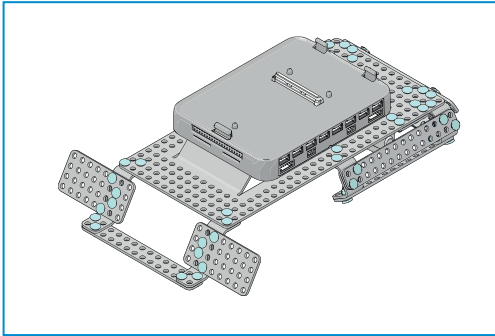# Front **bumper**

Part 3

x4
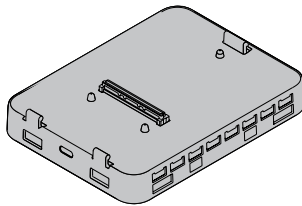Short Rivets

Part 2

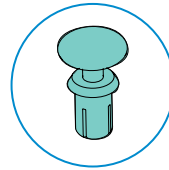Short Rivets

pi-top [4] Robotics Kit | Alex Build Instructions

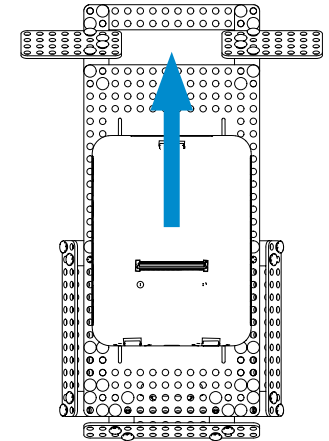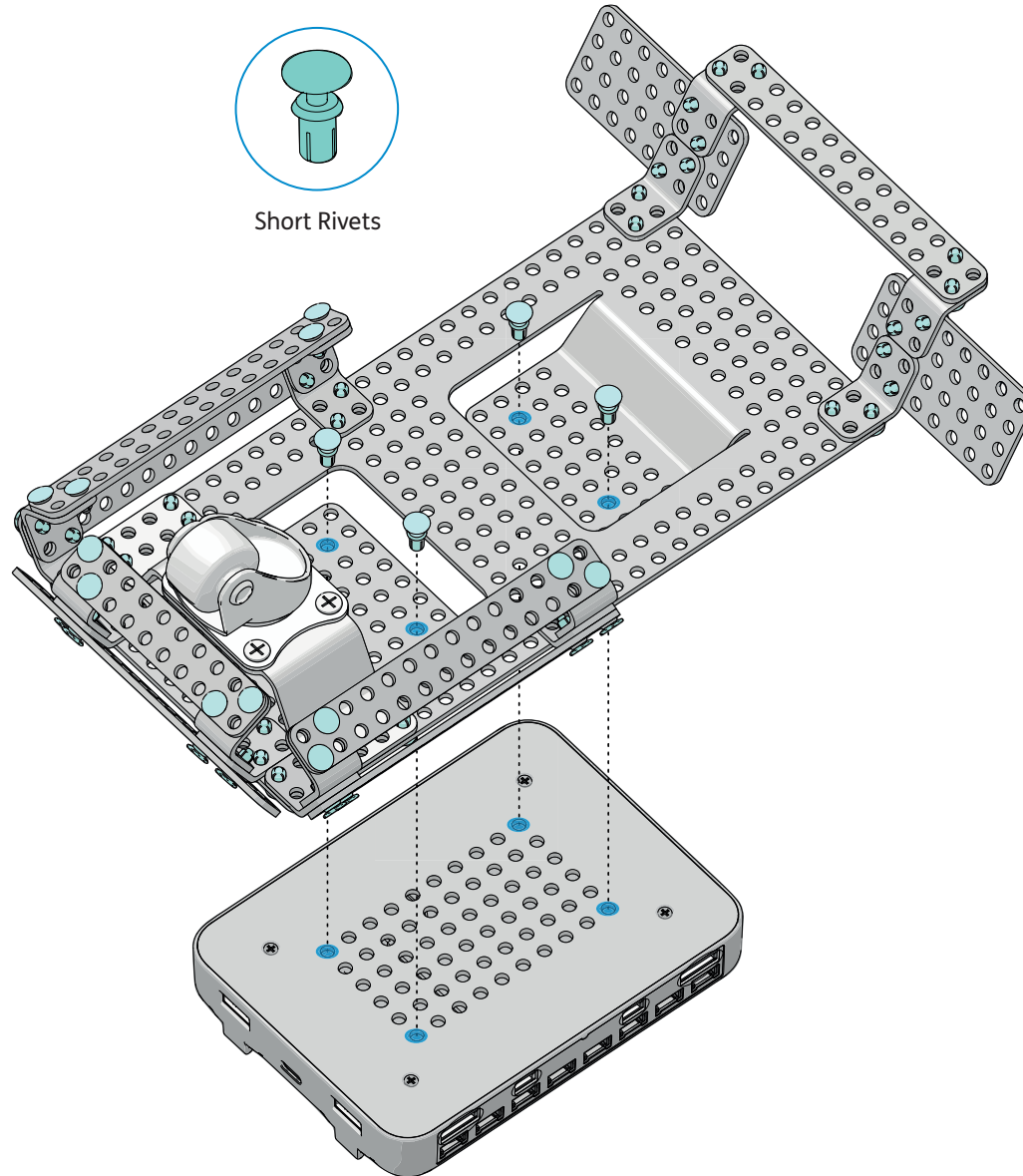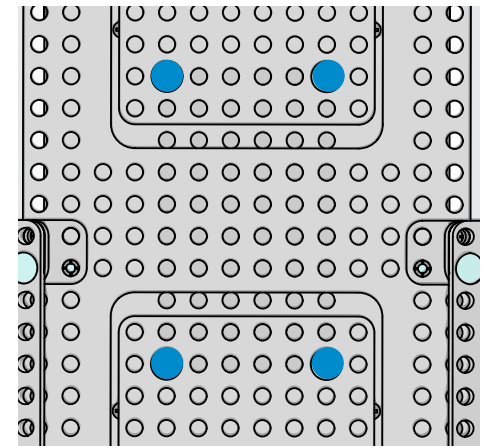# Expansion **Plate**
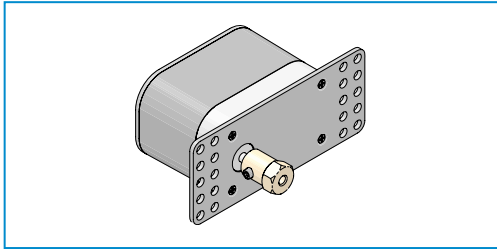
x1

Expansion Plate

x4

Short Rivets

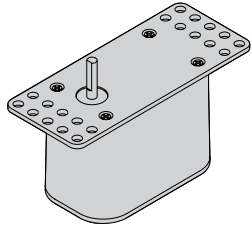Short Rivets

Make sure the
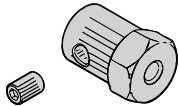Expansion Plate is
pointing forwards!

Left motor

Part 1

x1

Encoder Motor

x1

Wheel Connector
and Grub Screw

x1

2mm Hex Key

⚠️

Use the 2mm Hex
Key to tighten

Left motor

Part 2

x2

90° Build Plates
(2x5)

x8

Short Rivets

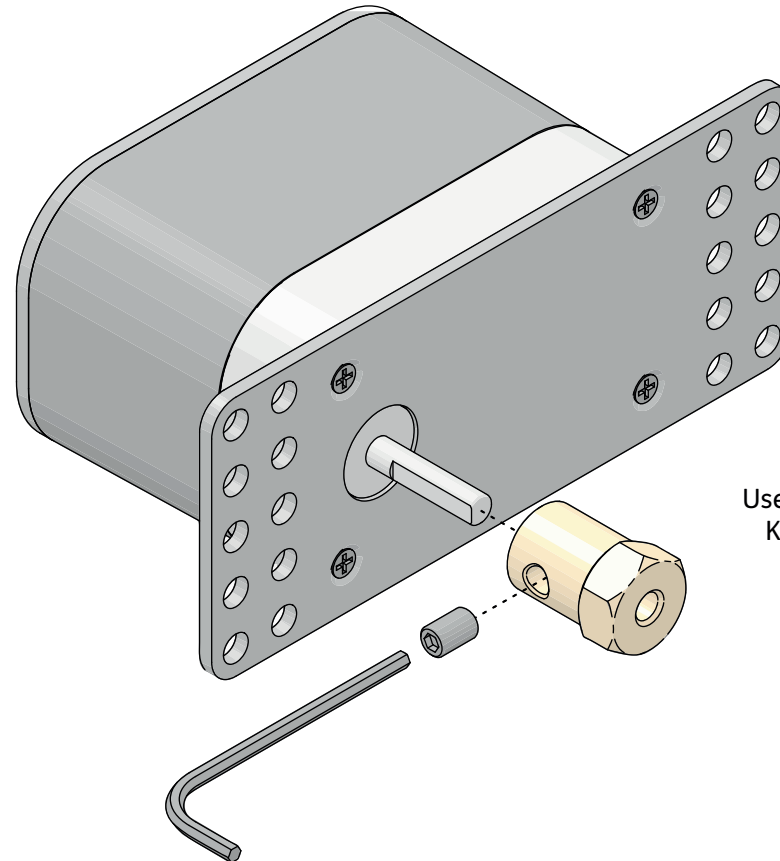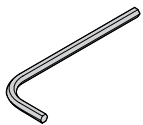Short Rivets

Right motor

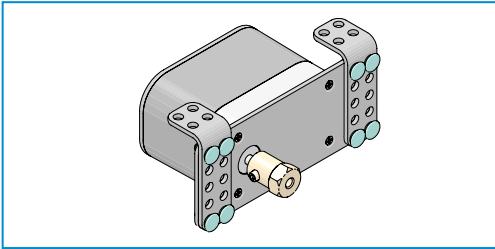Part 1

x1

Encoder Motor

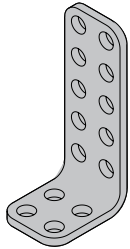**x1**

Wheel Connector
and Grub Screw

x1

2mm Hex Key
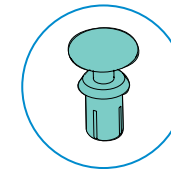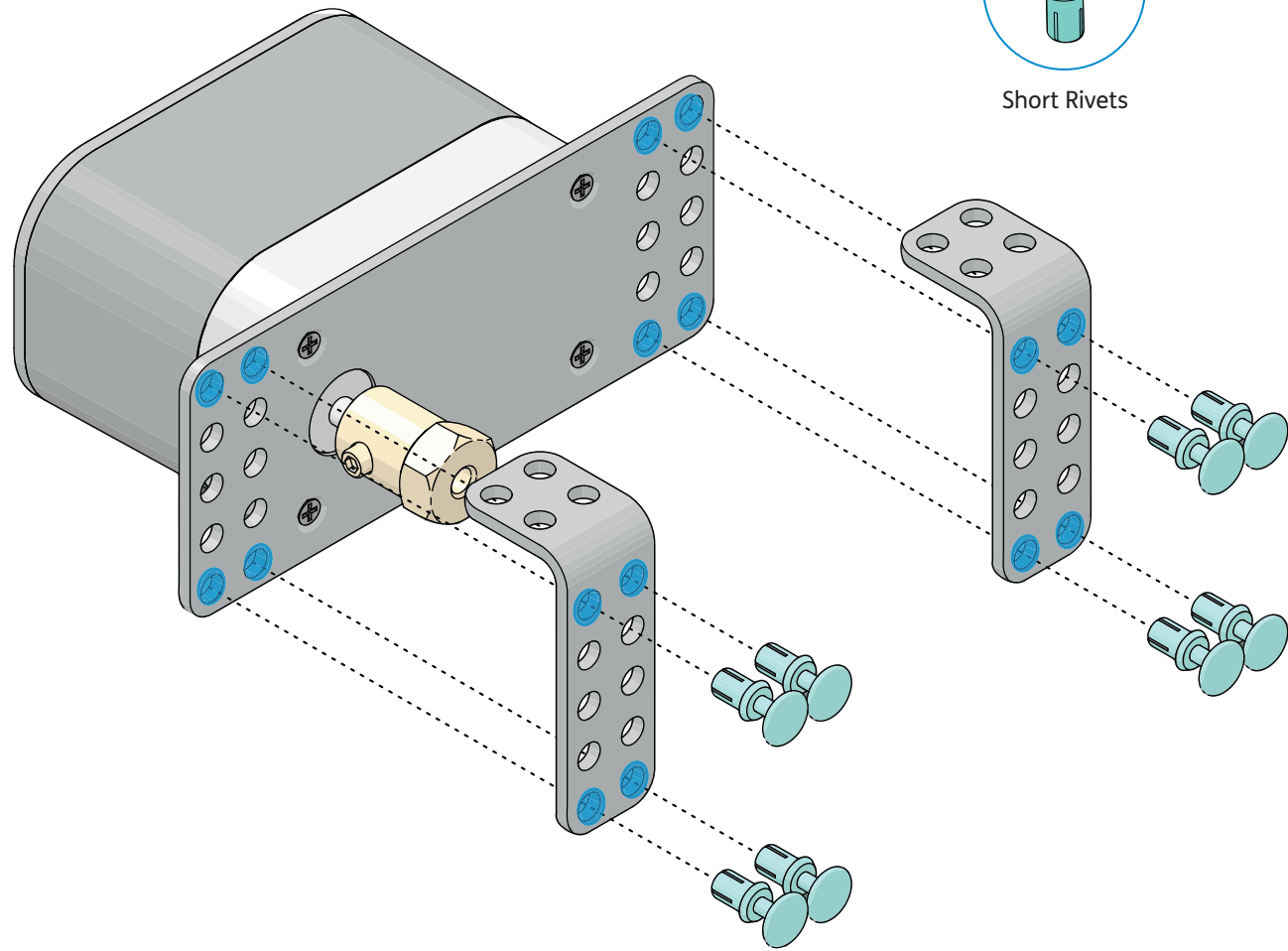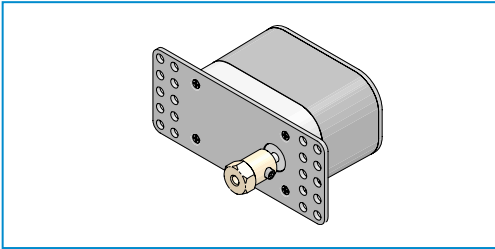
⚠️ Use the 2mm Hex
Key to tighten

Right motor

Part 2

x2
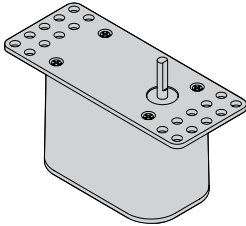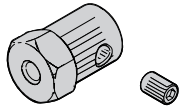
90° Build Plates (2x5)

x8
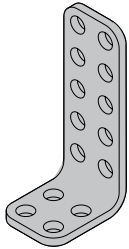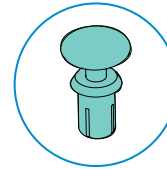
Short Rivets

Short Rivets

Motor assembley
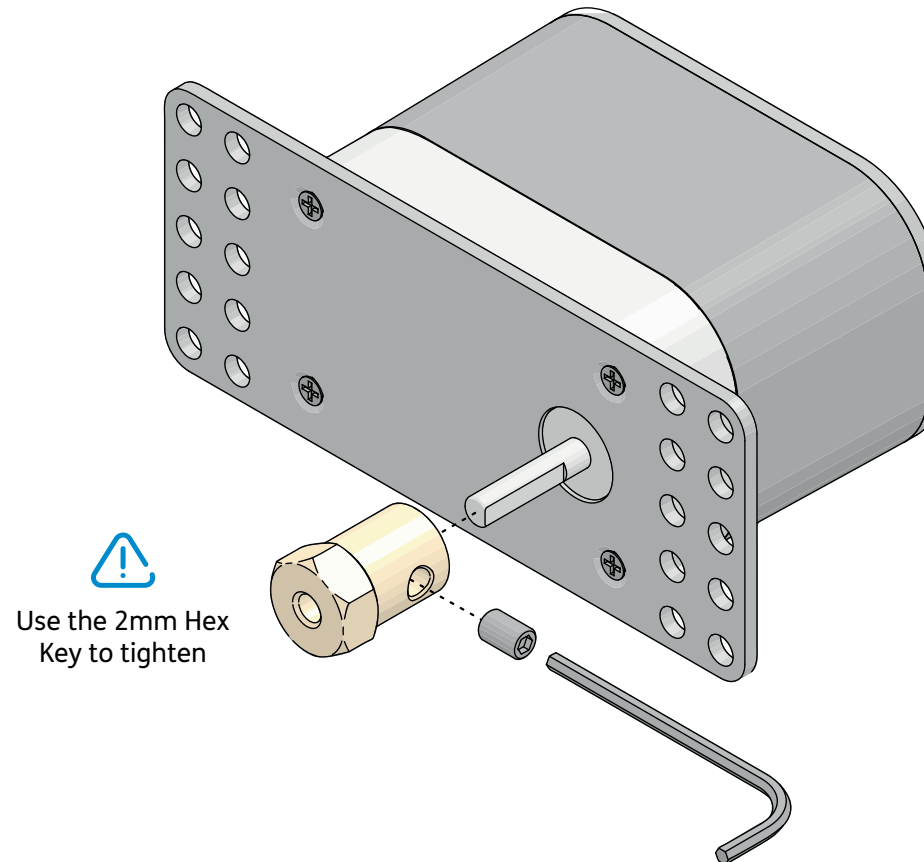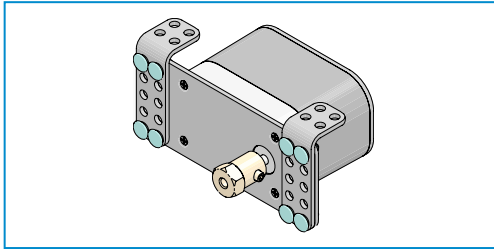
x8
Short Rivets

Short Rivets

Make sure the
motors are attached in
the correct direction!
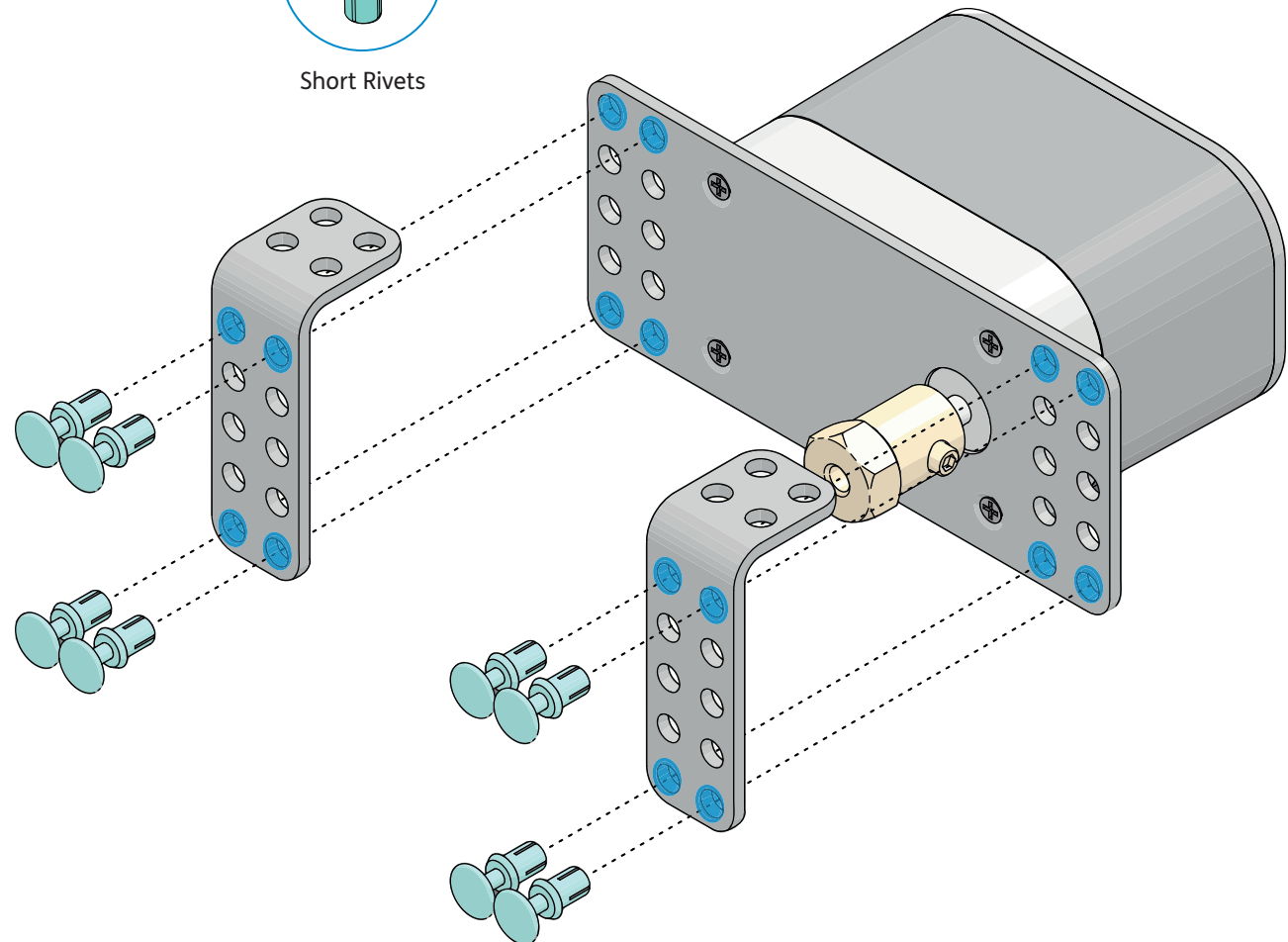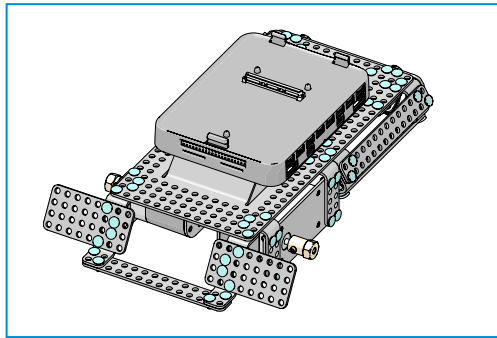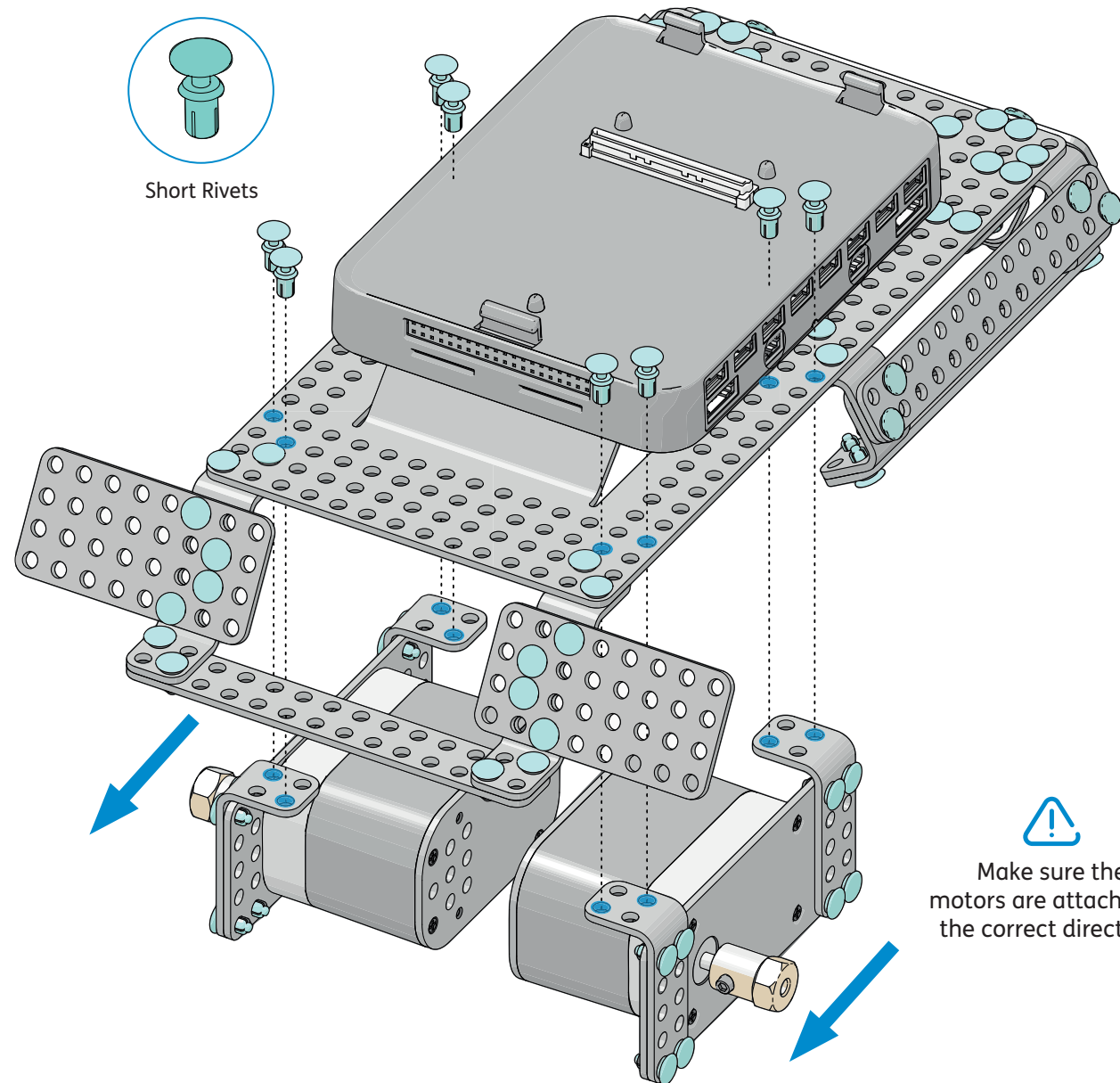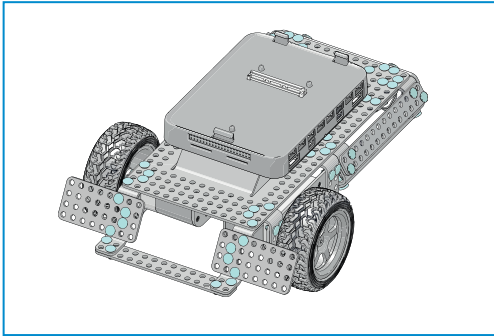
Wheels

x2

Wheels

x2
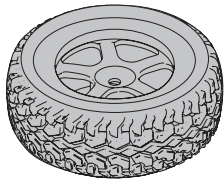
M4 Wheel Screws

x1

2.5mm Hex Key

⚠️

Use the 2.5mm
Hex Key to tighten
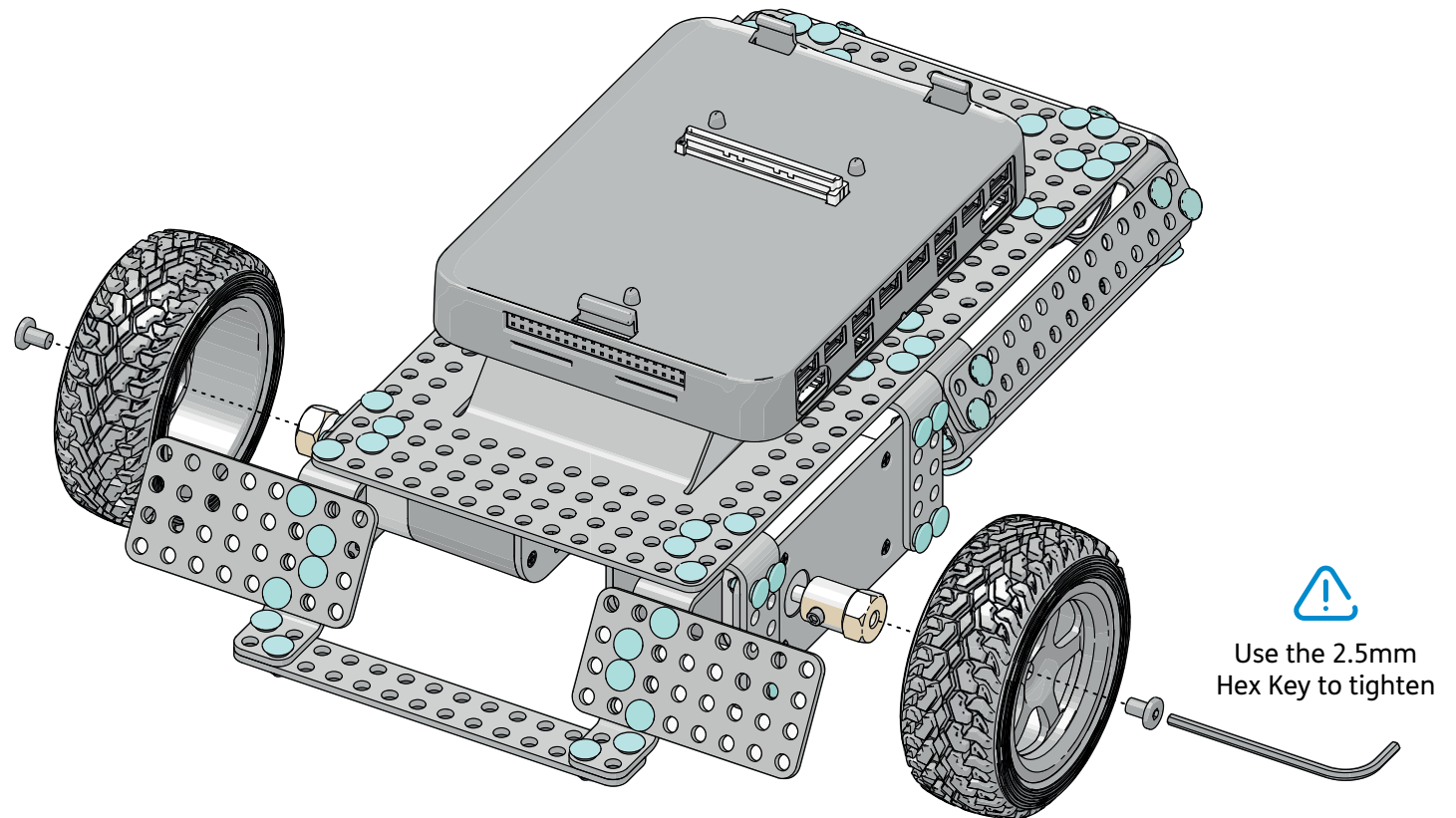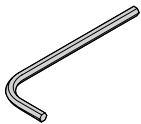
Pan-tilt servo mechanism
Part 1
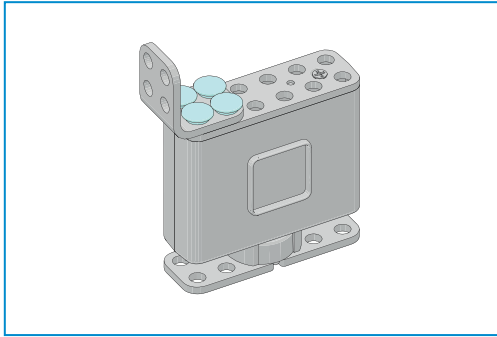
x1
90° Bracket
(2x2)

x1
Servo Motor

x4
Short Rivets
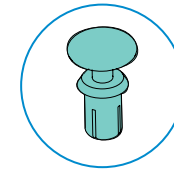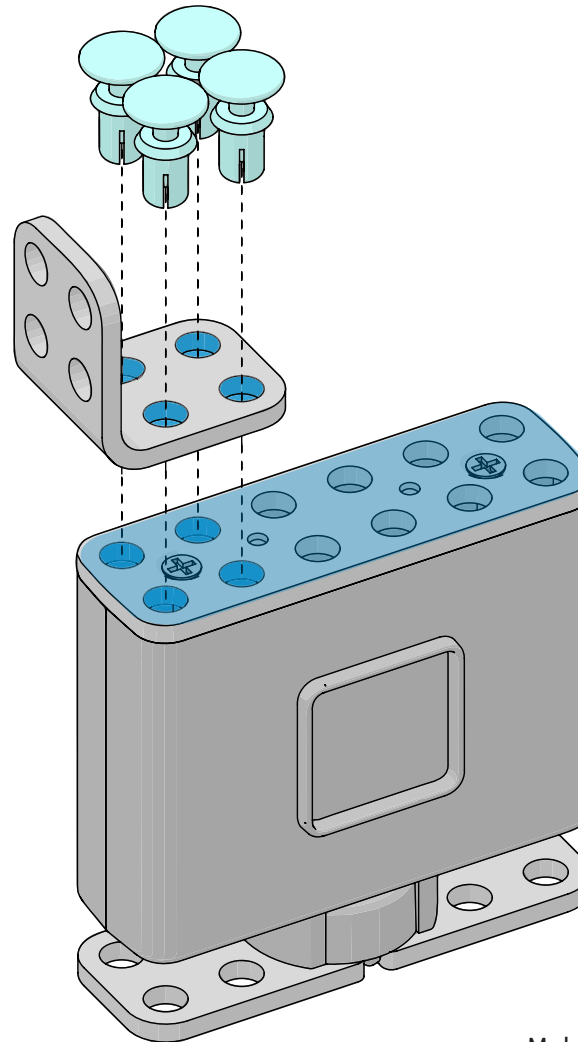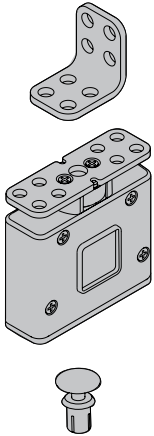
Short Rivets
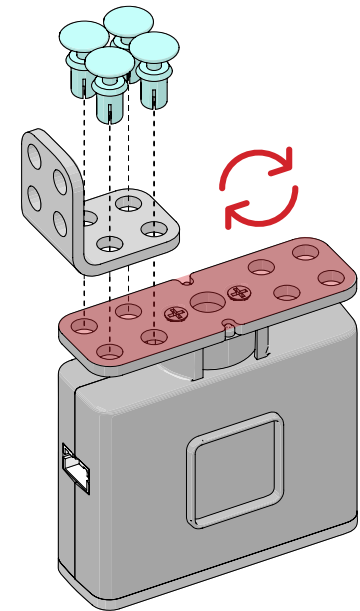
Make sure the
90° Bracket is attached
to the correct side!

Pan-tilt servo mechanism

Part 2

x1

Servo Motor

x4

Short Rivets

⚠️

Make sure the port is
facing upwards

Short Rivets

Part 1
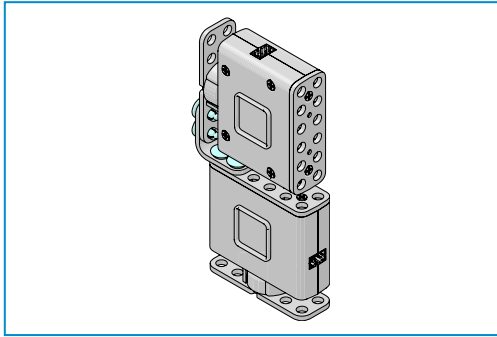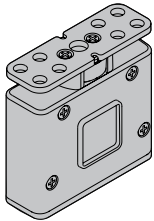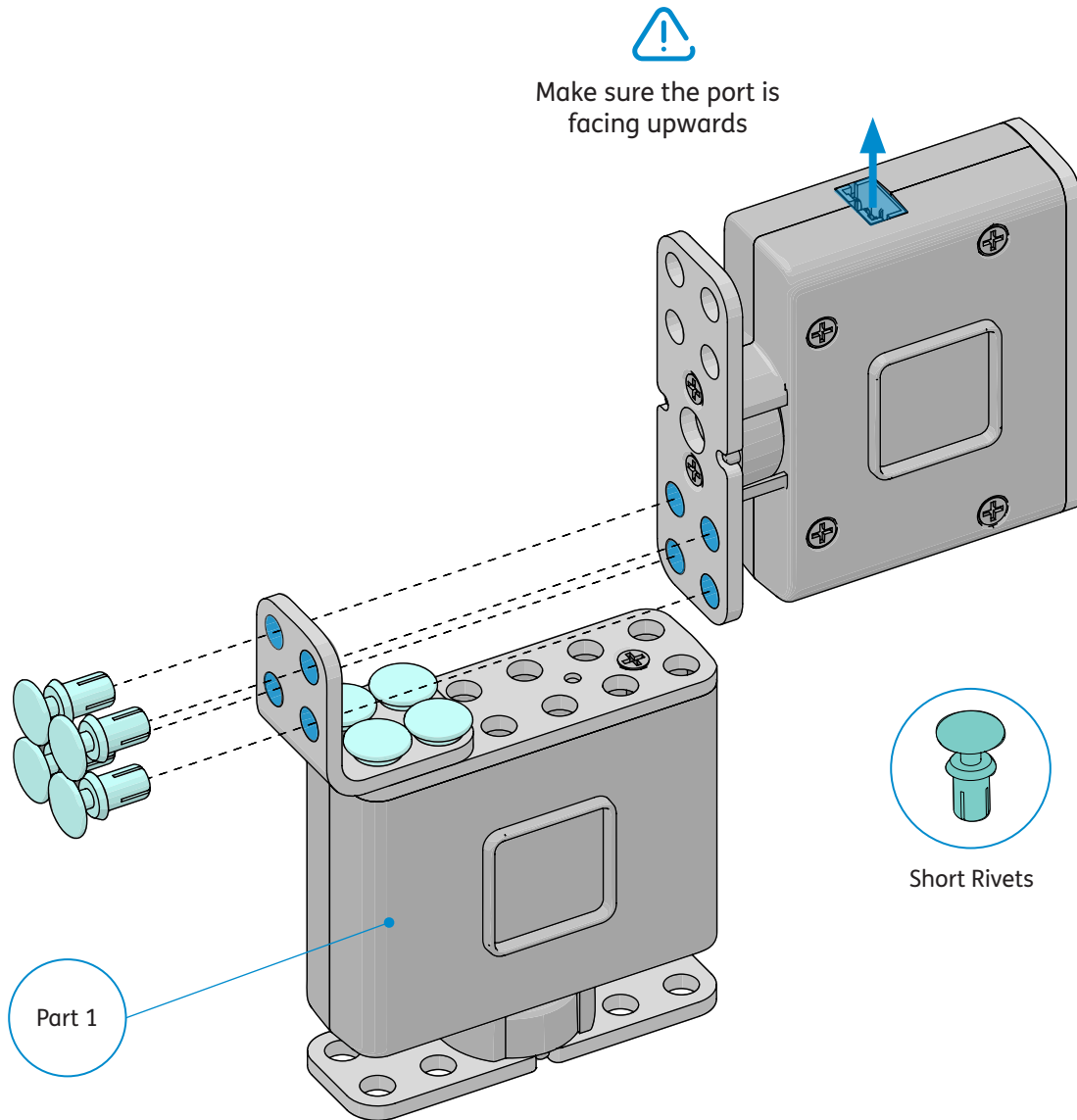
Pan-tilt servo mechanism
Part 3

x4

Short Rivets

Short Rivets

Part 2
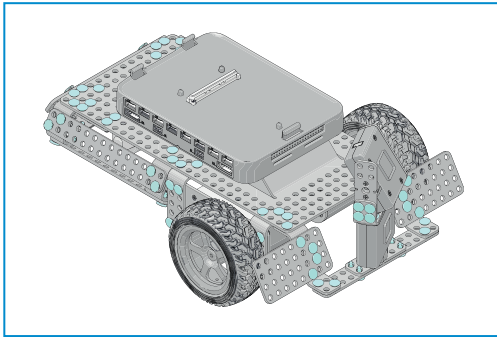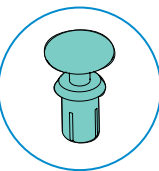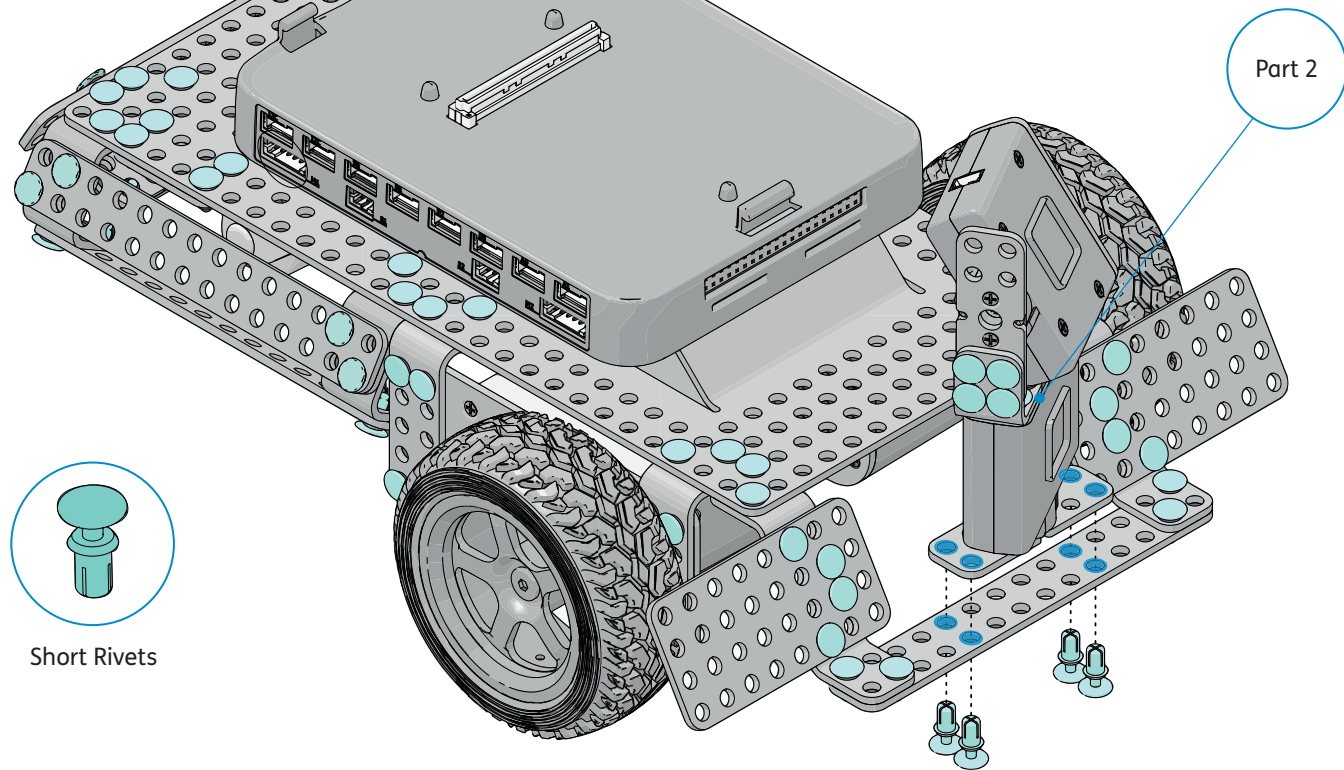
Camera

x1
Camera
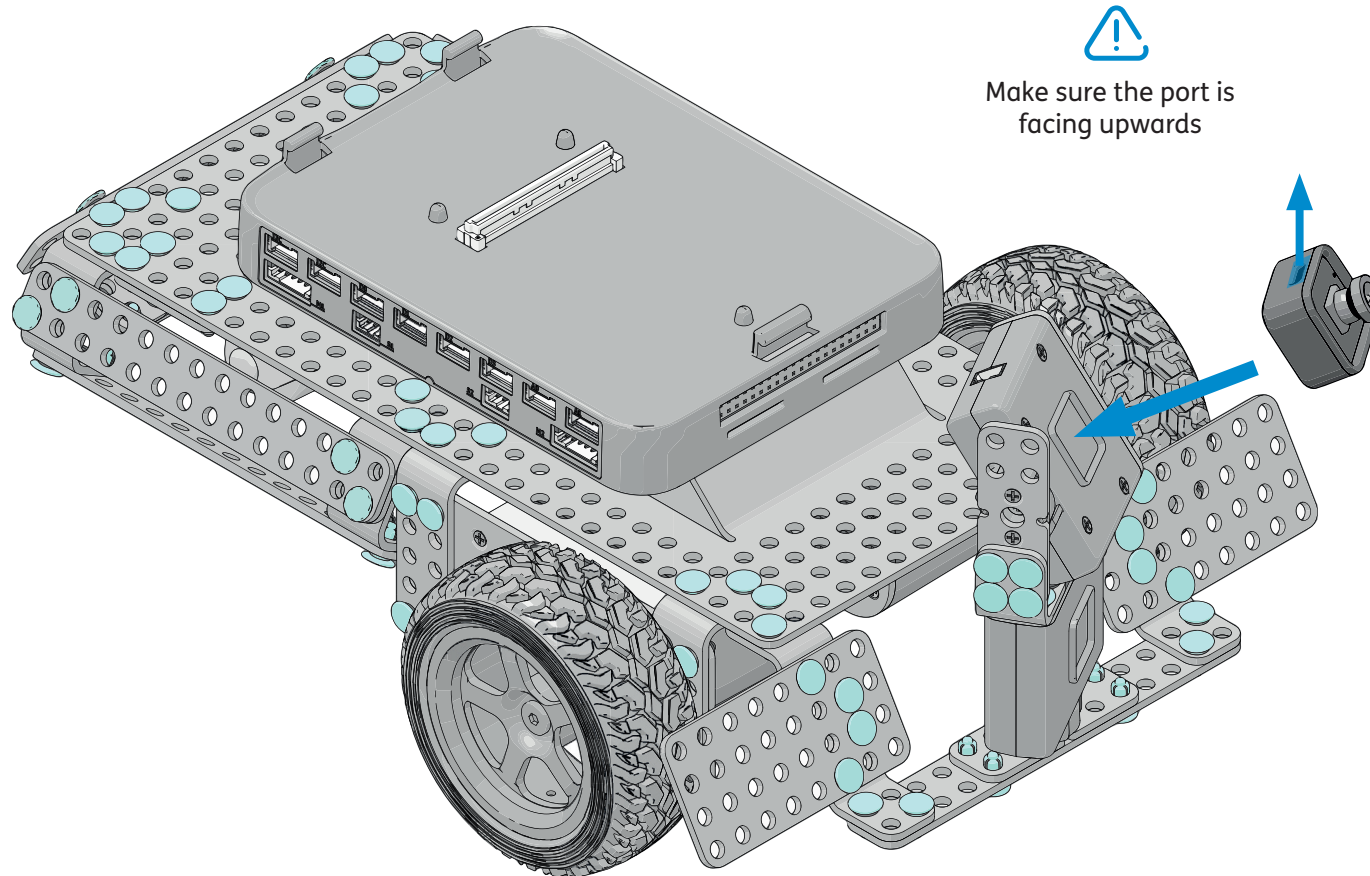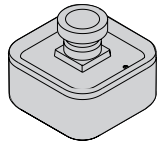
⚠
Make sure the port is
facing upwards

Ultrasonic Sensor

x1

Ultrasonic Sensor
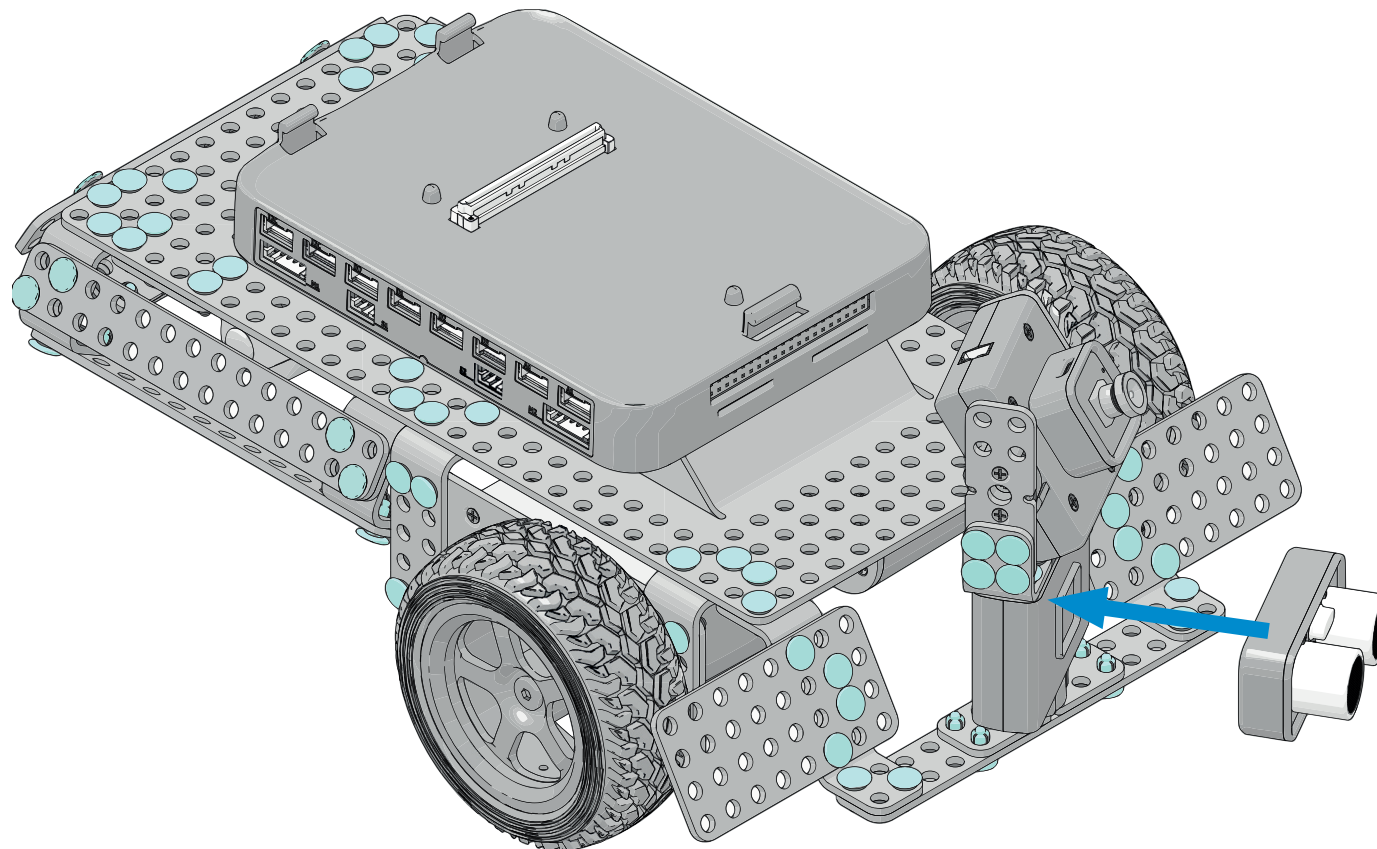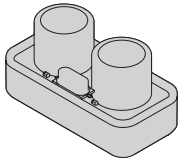
⚠️ Make sure the port is facing downwards

Dock the pi-top [4]
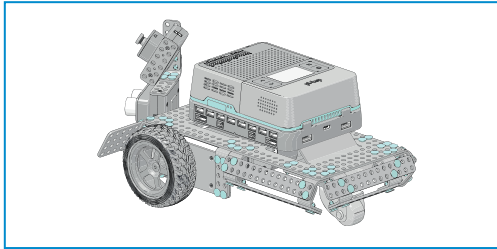
x1
pi-top [4]
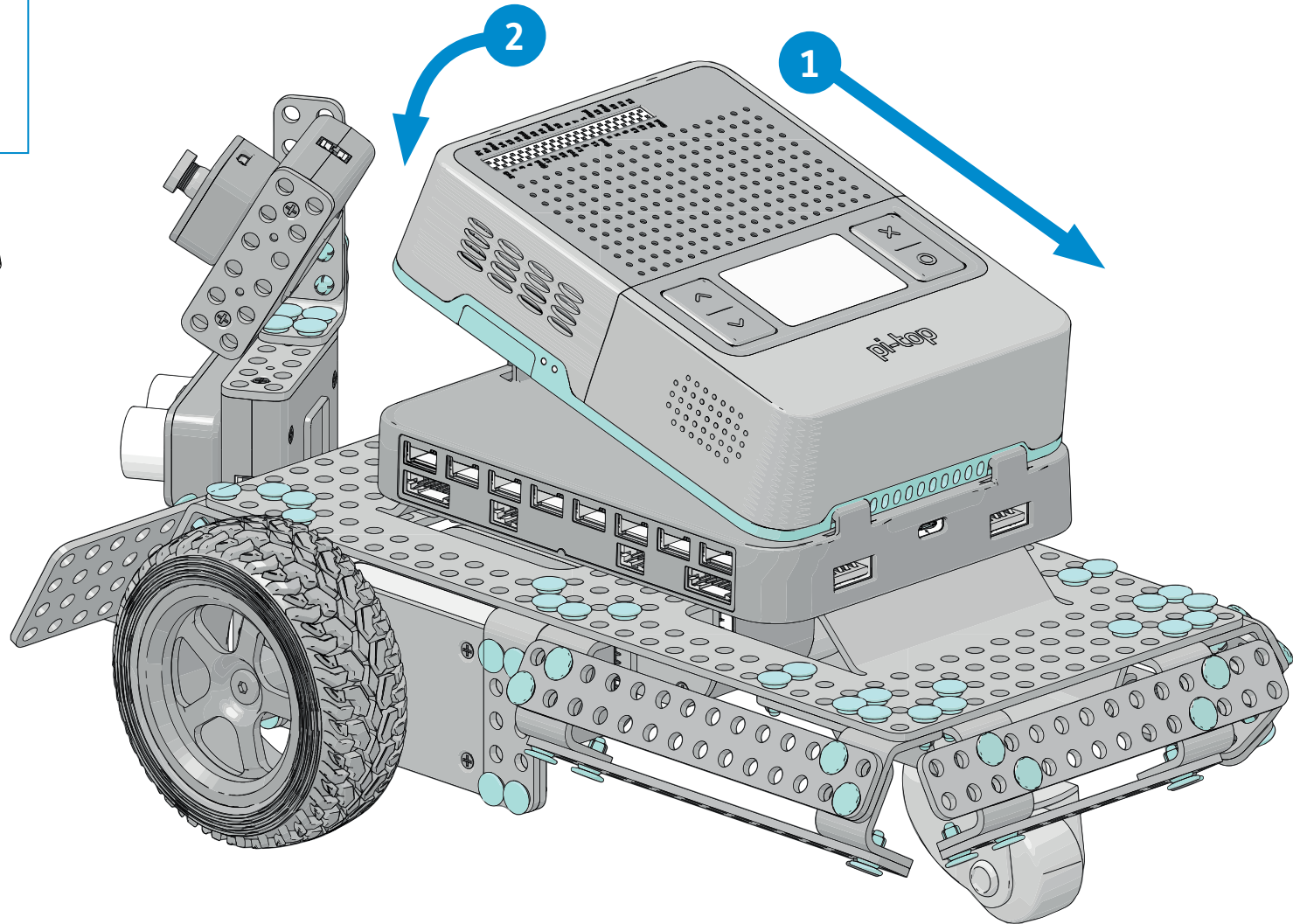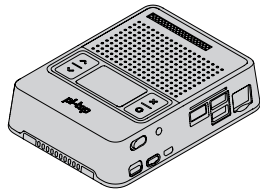
Connecting the Encoder Motors

x2

6-pin Encoder Motor Cables

Right Motor - M0

Left Motor - M3

Left Motor

Right Motor
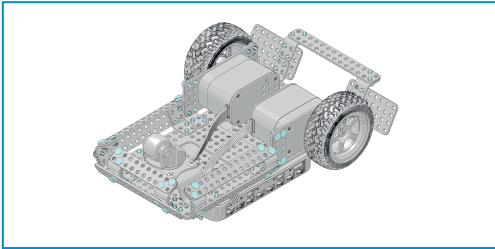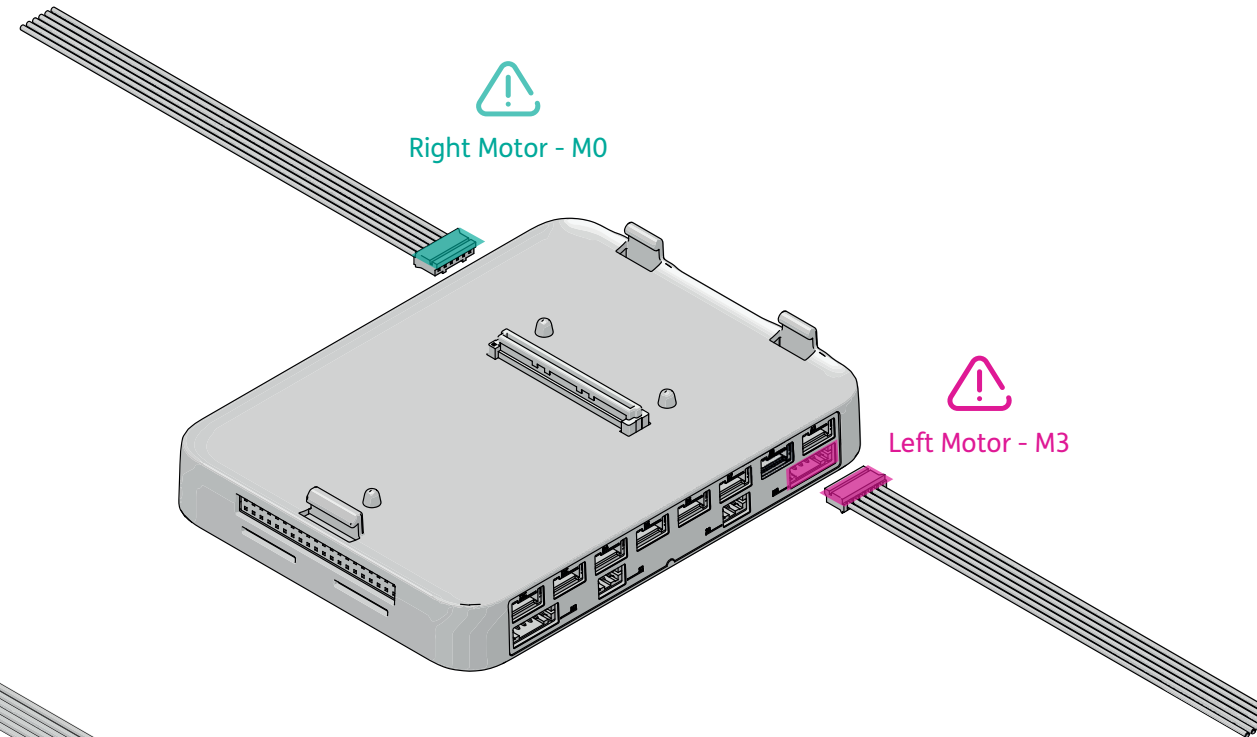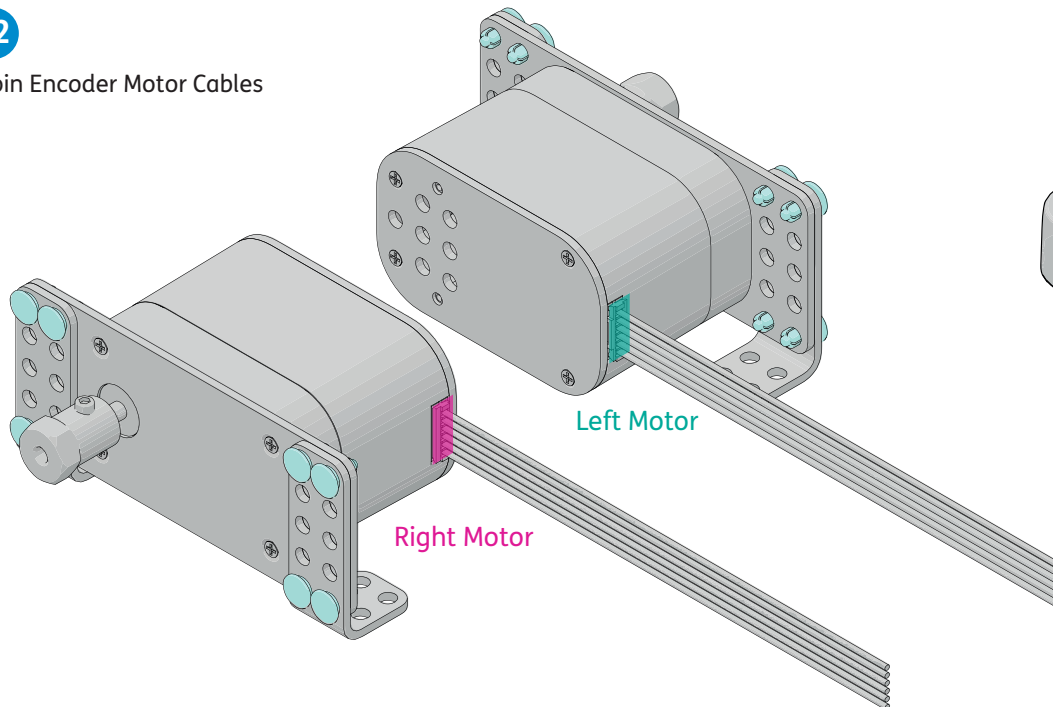
Connecting the Servo Motors

x2

3-pin Servo Motor Cables

Tilt Servo

Pan Servo - S0

Tilt Servo S3

Pan Servo

Connecting the Camera

Micro USB Cable

Any USB port on the
Expansion Plate or pi-top [4]
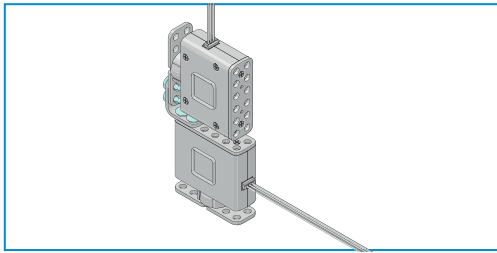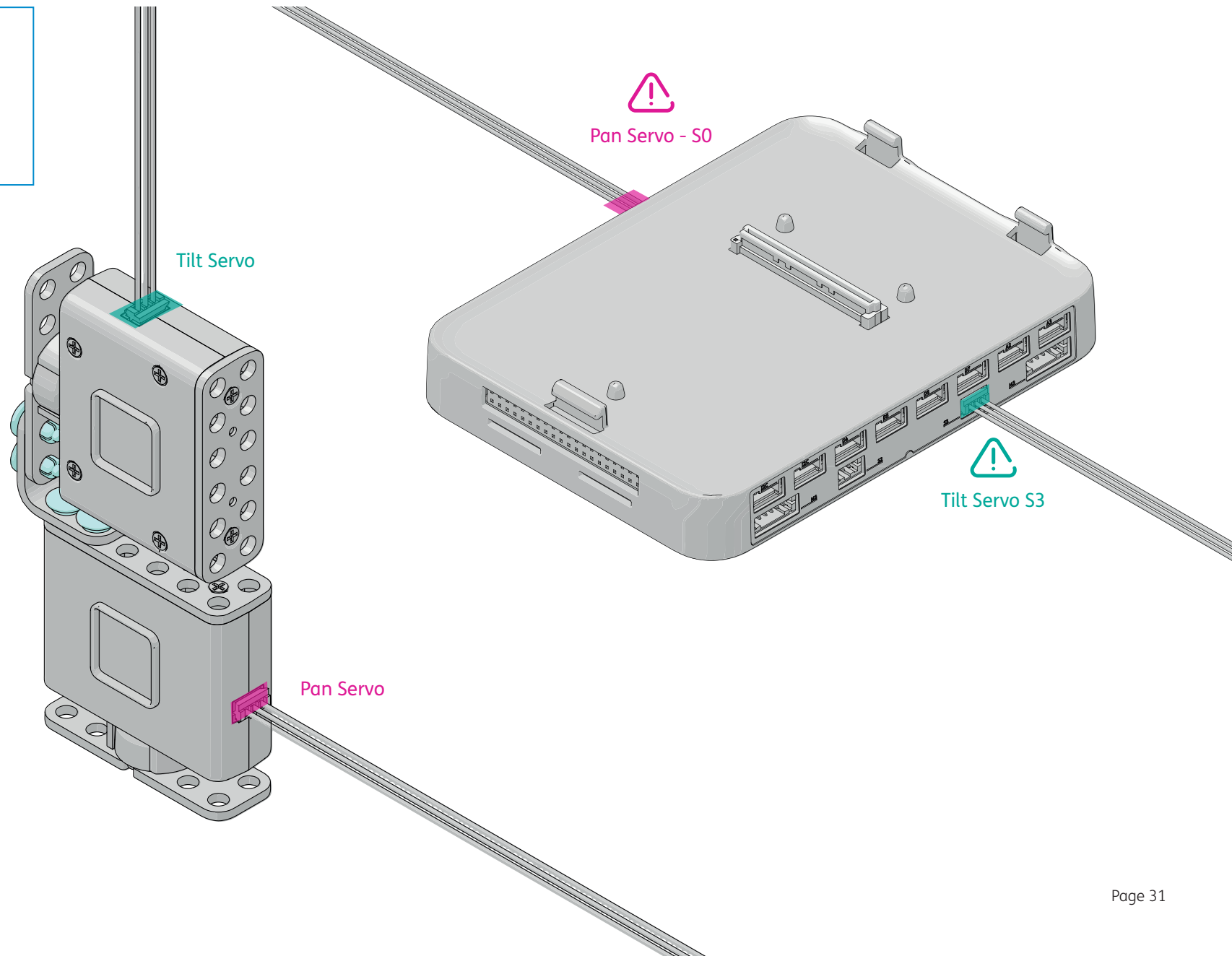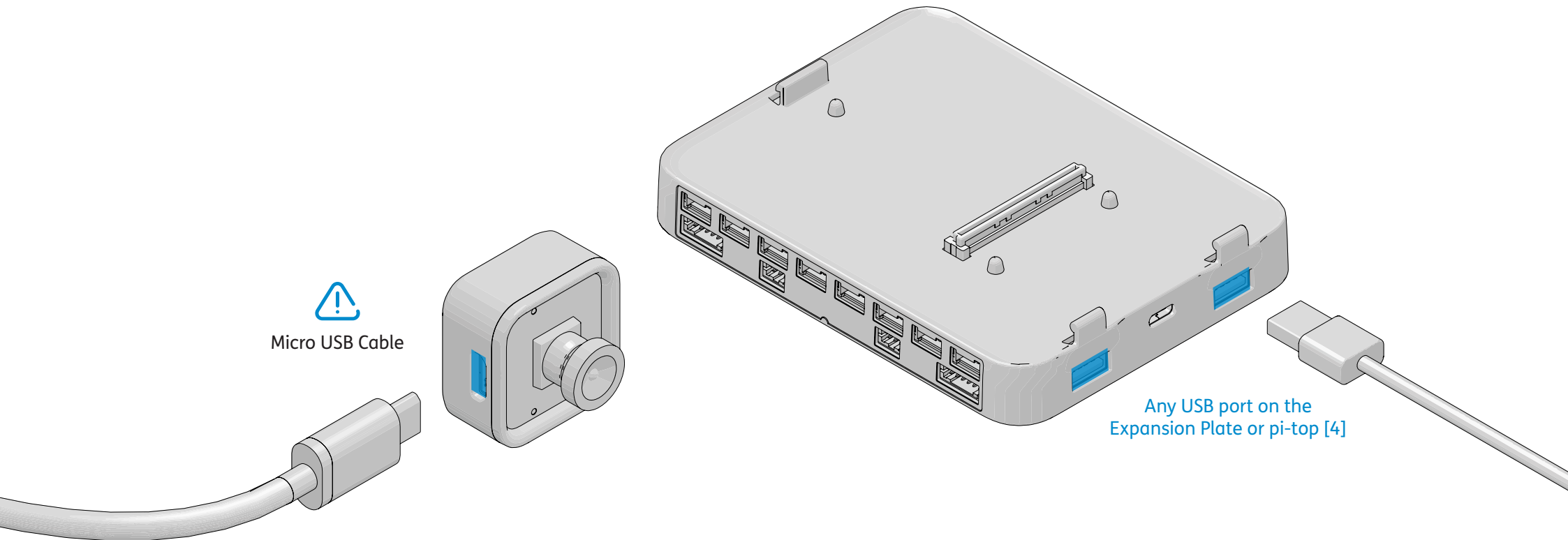
Connecting the Ultrasonic Sensor

x2

4-pin Sensor Cable

4-pin Sensor Cable

Ultrasonic Sensor - D3
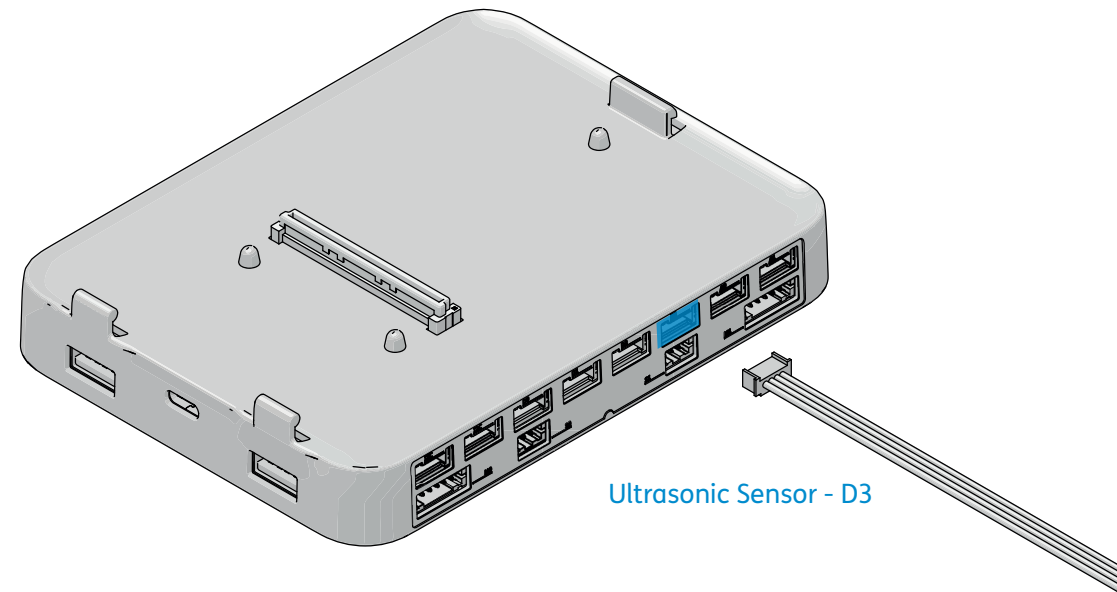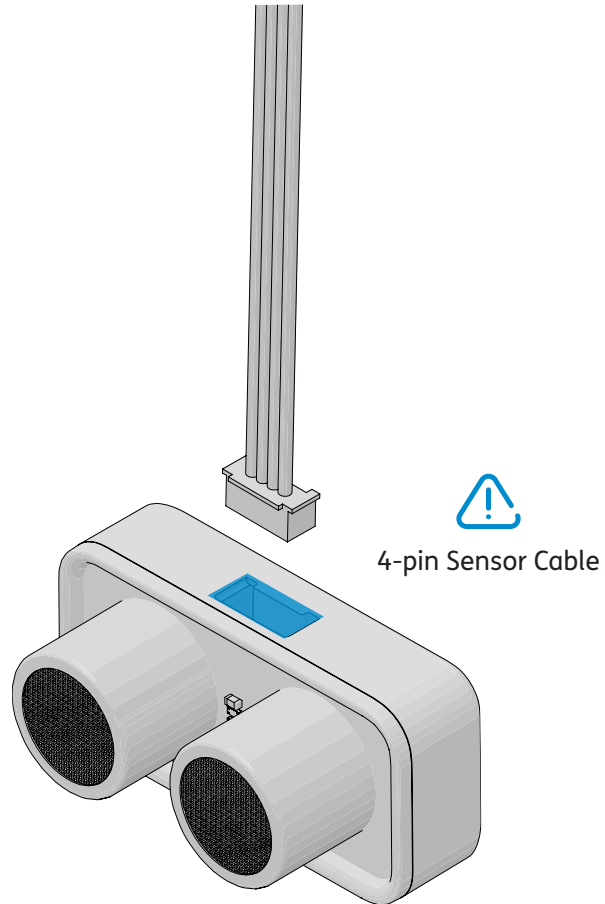
You're ready to get coding!

What's next?

pi-top Robotics Kit has a wide range of resources you can use to hit the ground running with your robotics journey. Whether you're just starting out, are a seasoned pro or anything in between there's something for everyone!

Beginner

Tutorials, courses and code libraries to help you make the most of your pi-top [4]

Our online learning platform that guides students and beginners through developing coding projects.

Log on to Further >

pi-top Python SDK
(Beginner to advanced)

Here you'll find all of our hardware drivers and libraries to make Python development as easy as possible.

pi-top Python SDK Documentation
(Beginner to advanced)

Comprehensive documentation for all pi-top products, including the Robotics Kit. It will help you navigate our SDKs so you can get the most out of them in the least amount of time.

pi-top Robotics Engine (ROS)
(Advanced)

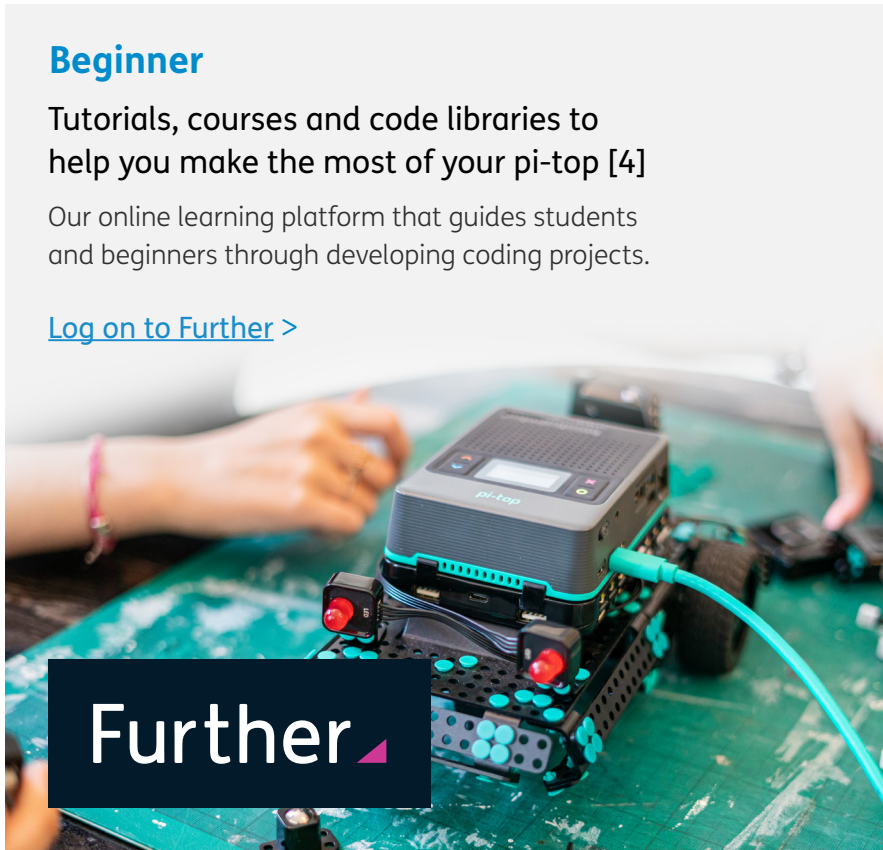A ROS (Robot OS) implementation that can be run on the pi-top hardware as a Docker container or as a simulation package on any Debian system - perfect for developing advanced machine learning and computer vision algorithms that you can then run in the real world! Here you'll find ROS packages, Gazebo simulation files and various apps we've developed so far that we are actively seeking community support on.

pi-top .NET Core SDK

Made in collaboration with Microsoft, you can see this SDK in action by watching our .NET Conf live video where we use it to demonstrate what a remote computer science class might look like using Microsoft Teams.

pi-top

Raspberry Pi made simple,
robust and modular.

pi-top.com

Having trouble? Check out:

pi-top.com/support or forum.pi-top.com