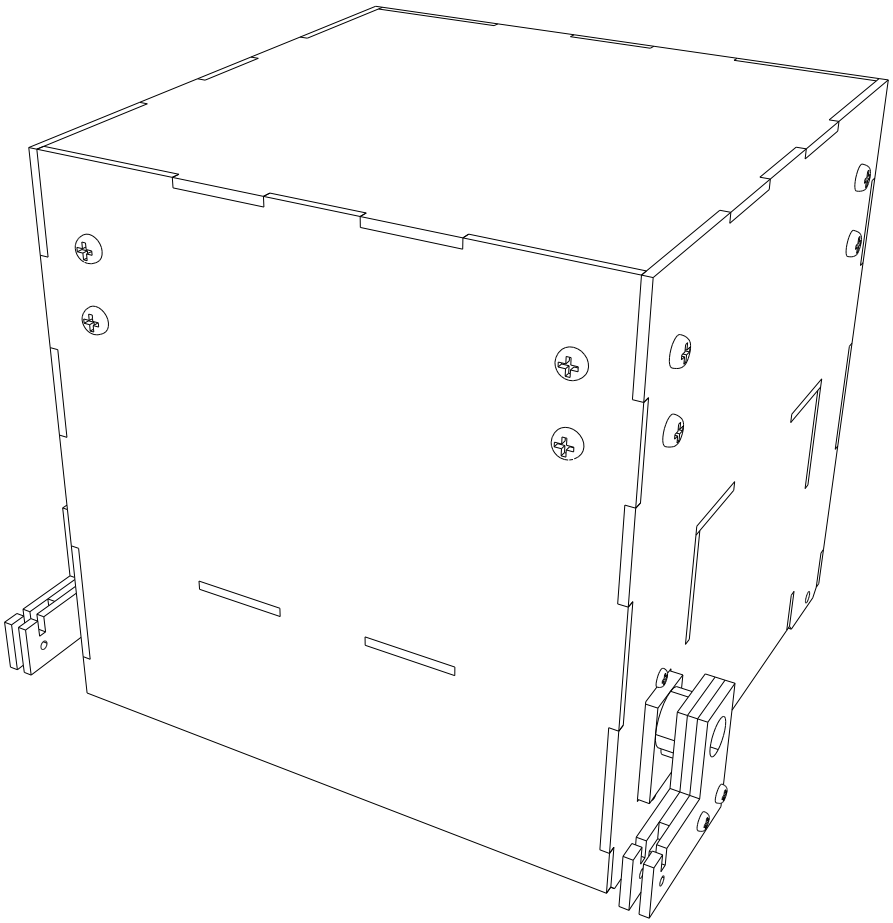
BOXZ Pro

Assembly Manual



WWW.BOXZ.CC

2014.09

READ FIRST

Thank you for purchasing our two-wheel-drive robot assembly kit “BOXZ Pro”. The Manual describes assembly of the robot and handling of its accessories. Read it thoroughly to assemble the Product with care.

- The first time to install this product may cost you about 2 hours, please arrange your time.

- The Product is an assembly kit. It may not be able to exhibit its intended performance depending on how you assemble it. If you cannot assemble it properly, utilize our support services. For details, see Last Page. INQUIRIES ABOUT TROUBLES, MISSING PARTS, DAMAGE, ETC.”

- This product can only be used in relatively flat environment. Such as indoor and outdoor flooring, square marble floor tiles . Do not be such as grass or mud uneven surfaces.

- Remove the battery and keep it after the end of the playing.

- The last Arduino code has been uploaded to your Arduino Board(Maybe UNO, ROMEO, ETC). Normally you just need to assemble all the parts toghter. Then please download our APP which named “BOXZ” from APP STORE , connect and control with your BOXZ via bluetooth.

- Programming and operation of the Product assumes use of a personal computer include the software which name Arduino(hereinafter, to be referred to as the PC). This software could be download from the following link: http://www.arduino.cc/ . The Manual and other accompanying manuals have been prepared, assuming that you are familiar with basic operation of the PC. Note that we cannot answer any questions or inquiries about operation of the PC or Windows.

- The following parts are not included in the kit

1. AA battery(5 pieces, 2000mAh or higher is recommended for the NiMH rechargeable battery)

- When beginning assembly, please prepare the tools below and pick out the parts from the Parts List:

Phillips and slotted screwdriver(for M2 and M3), Sleeve(for M2 and M3), Electric iron and a small amount of solder wire, small diagonal pliers, paper tape(or masking tape for temporary support fixed installation).

*The specifications are subject to change without prior notice due to improvement or enhanced performance.

Introduction to BOXZ

What is BOXZ?

BOXZ is is an open source robot platform as do-it-yourself electronic pet! We connected Arduino, Plexiglas(PMMA), Origami and idea together, so we can easily and quickly build a remote robot by ourself! We can control it via mobile phone or some other controller to playing football game, racing, fighting or some other interesting things! Have fun!

PRECAUTIONS PRIOR TO ASSEMBLY

• Note that the Product is an assembly kit and does not always assure robot operations after its assembly.

• When you use, assembly or store the Product and its parts, make sure that there are not infants around you. The Product comes with small parts. Care should be taken so that they will not swallow them by mistake.

•The Product is not a toy. When it is operated by a child, his/her parent must be present to watch.

•Do not wet the Product or its part, or use/store them at high humidity or in an environment where due condensation may occur.

• Use the tools with utmost care paid to safety.

•Do not disassemble or remodel servo motors and PC boards because they are precision electronic parts. Neglect of this may cause a trouble or a resultant electric shock or fire.

• Care should be taken not to allow conductive foreign substances into contact with the PC boards. - As the terminals of the PC boards are exposed, they can be easily short-circuited by conductive foreign substances (metals, water, etc.). Short-circuit could result in a PC board failure or ignition of the battery or wiring.

• When you adjust or operate the Product after its assembly, it may move in an unexpected way in the nature of the assembly it. It may tumble or drop to injure you or get damaged. Secure sufficient work space and operate. Handle the Product with utmost care because it may catch your finger while operating. We strongly recommend that for the first power on test on the floor or ground, rather than on the table.

•Connect the connectors securely, paying attention to their polarity. Neglect of this could cause a trouble or fire.

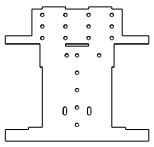
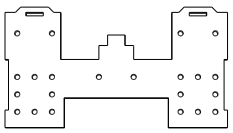
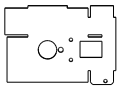
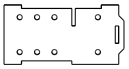
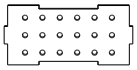
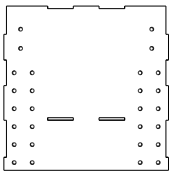
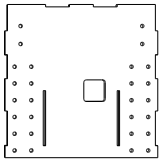
• Do not allow the cables to be caught when assembling. Catching of the cable could cause snapping or short-circuit.

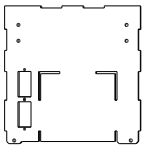
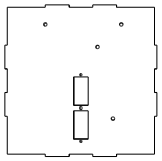
• When disconnecting a cable, hold its plug and connector. If it is disconnected by holding its cord, an electric shock or fire may be caused by snapping or shortcircuit.

•For handling of the battery and battery charger(If have), be sure to observe the instructions described in the Instruction Manual, BOXZ Assembly Manual and BOXZ Commissioning Manual.

Parts List

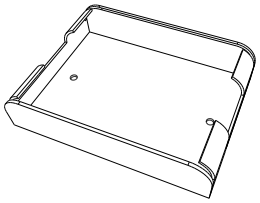
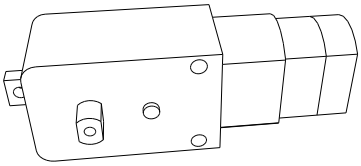
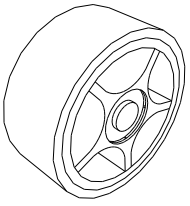
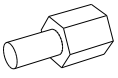
1. Plexiglas Parts(Standard Suit)

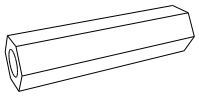
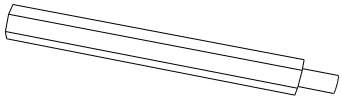
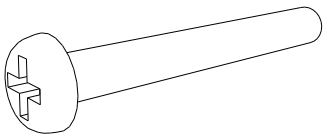
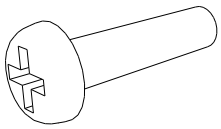
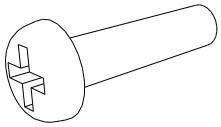
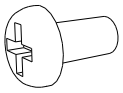
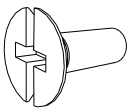
No.	Name	Overview	Quantity
01	P201 Main support board		1
02	P202 Front support board		1
03	P003 Motor support board		2
04	P204 Wheel side vertical board		2
05	P205 Wheel covers horizontal board		2
06	P022 Peripheral front board		1
07	P032 Peripheral back board		1

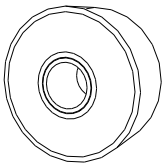
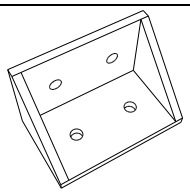
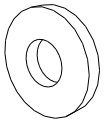
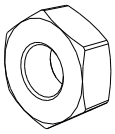
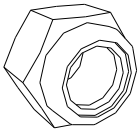
08	P042 Peripheral side board		2
09	P052 Peripheral roof board		1
Total			13

* Purchase different packages suit may have different part, most of them are compatible. Please find detail information in the assembly process diagram.

2. Component Parts(Standard Suit)

No.	Name	Overview	Quantity
10	C032 Battery case 5 x AA		1
11	C010 TT Reduction Gear 1:48		2
12	C001 DC Motor 130, 6V		
13	C024 Wheel 65MM		2
14	C182 Hexagonal pillars M3x6+6		2

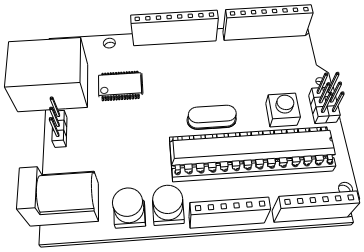
15	C171 Hexagonal pillars M3x6		4
16	C178 Hexagonal pillars M3x22		2
17	C179 Hexagonal pillars M3x50+6		4
18	C130 cross round-headed bolt M3x25		4
19	C114 cross round-headed bolts M3x10		16
20	C115 cross round-headed bolts(Metal) M3x12		4
21	C122 Cross round-headed bolt M3x6		6
22	C132 Cross sunk-headed bolt M3x6		2

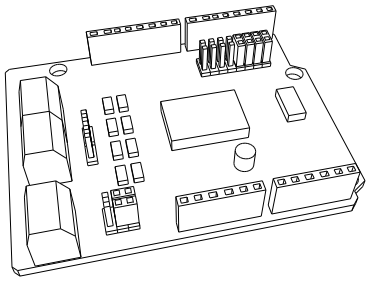
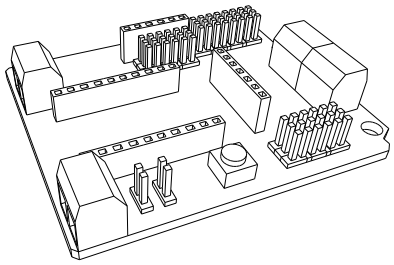
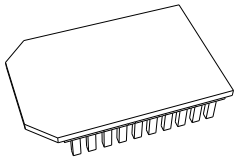
23	C028 Bearing 623(3*10*4)		4
24	C092 PA 19x33 D15		4
25	C207 Spacer M3		4
26	C205 Nut M3		24
27	C203 Nut M3 self-locking (Metal)		4
Total			91

* Purchase different packages suit may have different part, most of them are compatible. Please find detail information in the assembly process diagram.

** If no special instructions, screws and nuts are nylon.

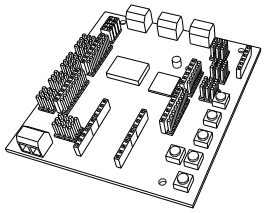
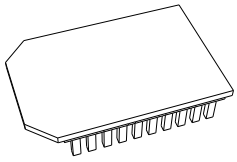
3. Electronic Parts(Standard)

No.	Name	Overview	Quantity
31	E201 DFRobot DFRduino UNO R3 (Arduino Uno R3)		1

32	E202 DFRobot L298 Shield (2A Motor Shield For Arduino)		1
33	E206 DFRobot IO Expansion Shield for Arduino V7		1
34	E208 DFRobot Arduino Bluetooh Bee V2		1
Total			4

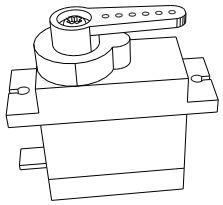
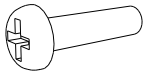
* Purchase different packages suit may have different board, most of them are compatible. Please find detail information in the assembly process diagram.

4. Electronic Parts(ROMEO)

No.	Name	Overview	Quantity
35	E206 DFRobot Romeo V2		1
36	E207 DFRobot BLE-Link BEE 4.0		1
Total			2

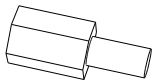
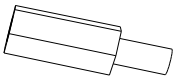
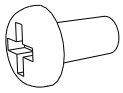
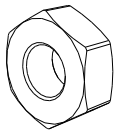
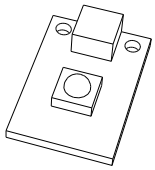
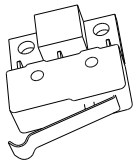
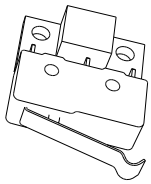
* Purchase different packages suit may have different board, most of them are compatible. Please find detail information in the assembly process diagram.

4. Football Extended Package Parts

No.	Name	Overview	Quantity
41	C041 9g micro servo (1.6kg)		2
42	P011 Arm outer board		4
43	P012 Arm inner board		2
44	C103 cross round-headed bolt(Metal) M2x8		8
45	C201 nut(Metal) M2		8
Total			24

* Purchase different packages suit may have different board, most of them are compatible. Please find detail information in the assembly process diagram.

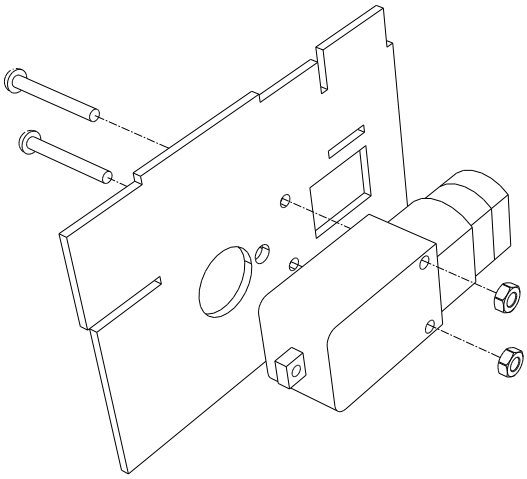
5. Dodgem Extended Package Parts

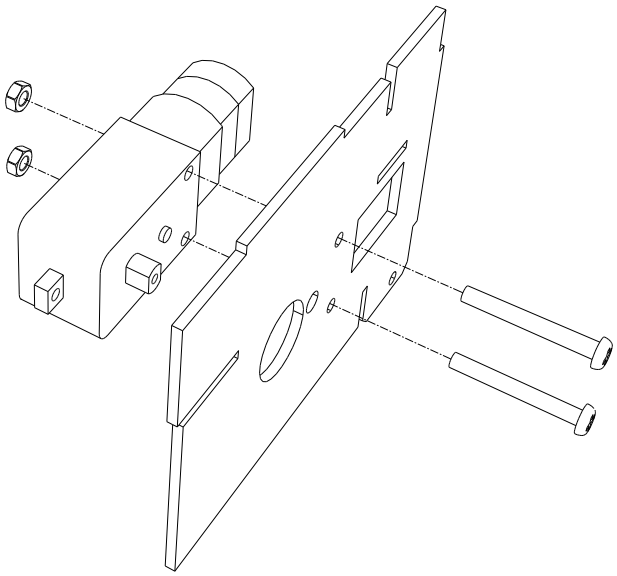
No.	Name	Overview	Quantity
51	C164 Hexagonal pillars(Metal) M3x8+6		10
52	C166 Hexagonal pillars(Metal) M3x12+6		4
53	C112 Cross round-headed bolt(Metal) M3x6		14
54	C202 nut(Metal) M3		14
55	Digital piranha LED light module-White		4
56	Crash sensor(Left)		1
57	Crash sensor(Right)		1
Total			48

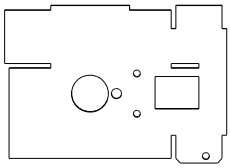
* Purchase different packages suit may have different board, most of them are compatible. Please find detail information in the assembly process diagram.

ASSEMBLY of BOXZ

Step 01

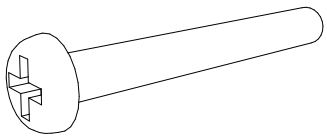






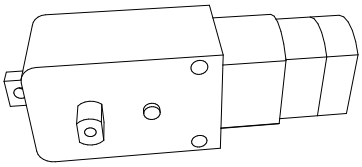
P203
Plexiglas

X2



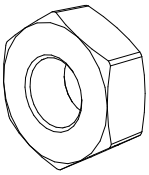
C178
M3x25

X4



C001+
C010

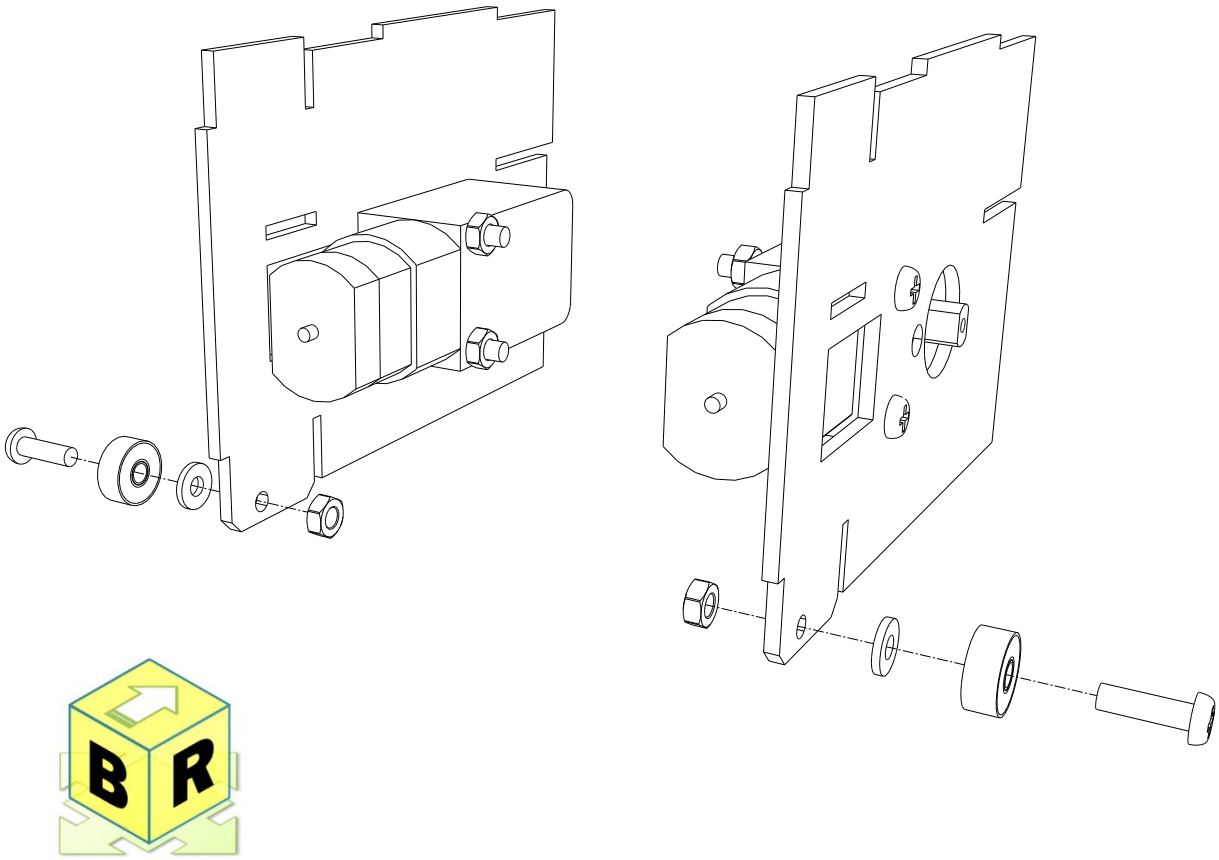
X2

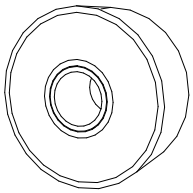


C205
Nut M3

X4

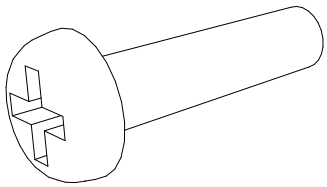
Step 02





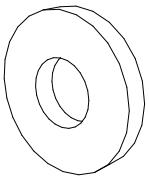
C028
Bearing

X2



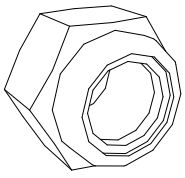
C115
M3x12

X4



C207
Spacer M3

X2

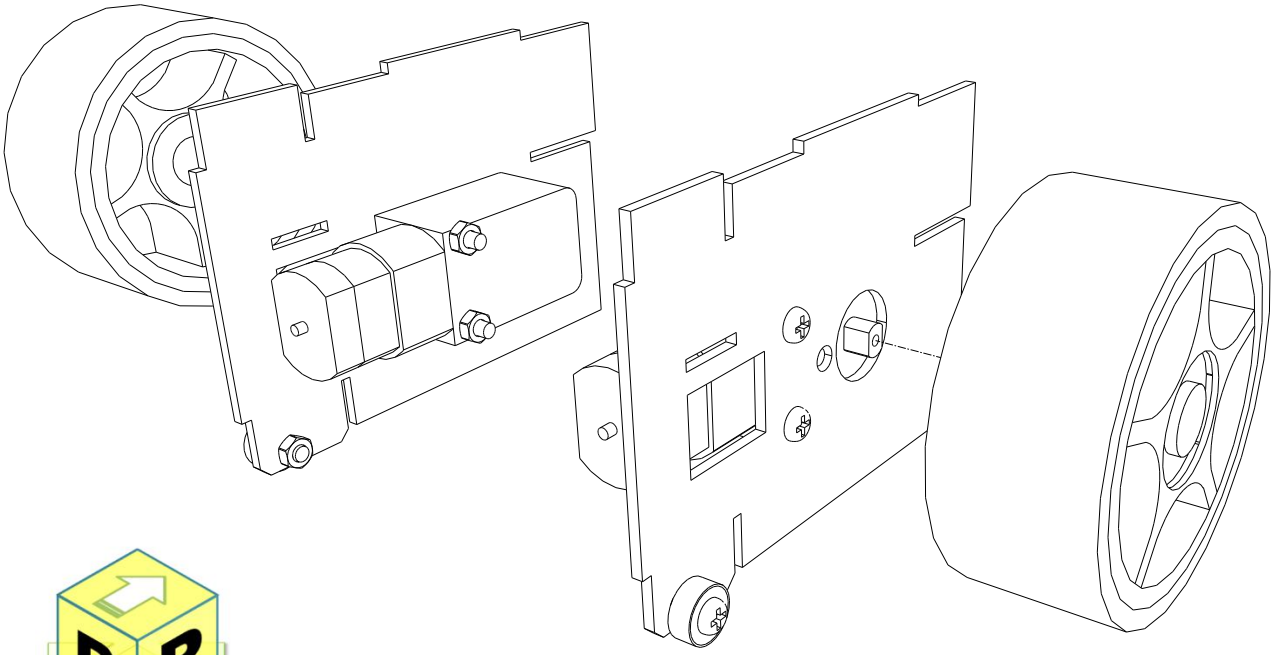


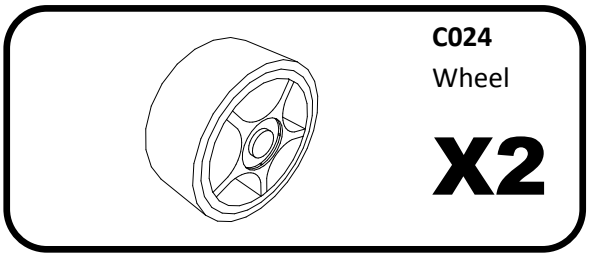
C203
Nut M3 SL

X2

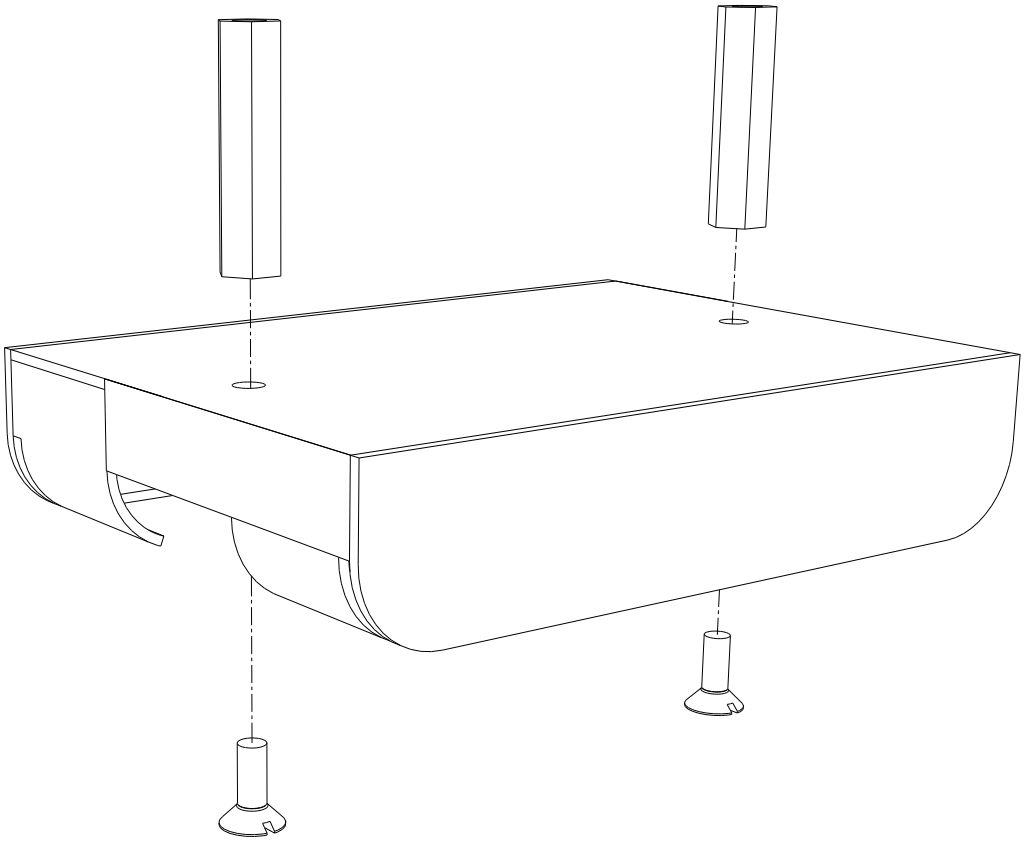
Step 03

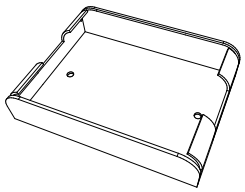
After install the wheels, we need to cut and weld the wire to the motor!





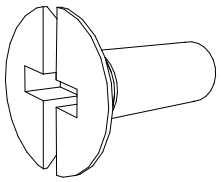
Step 04





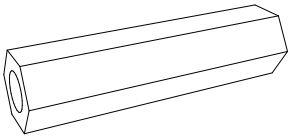
C032
Battery

X1



C132
M3x6

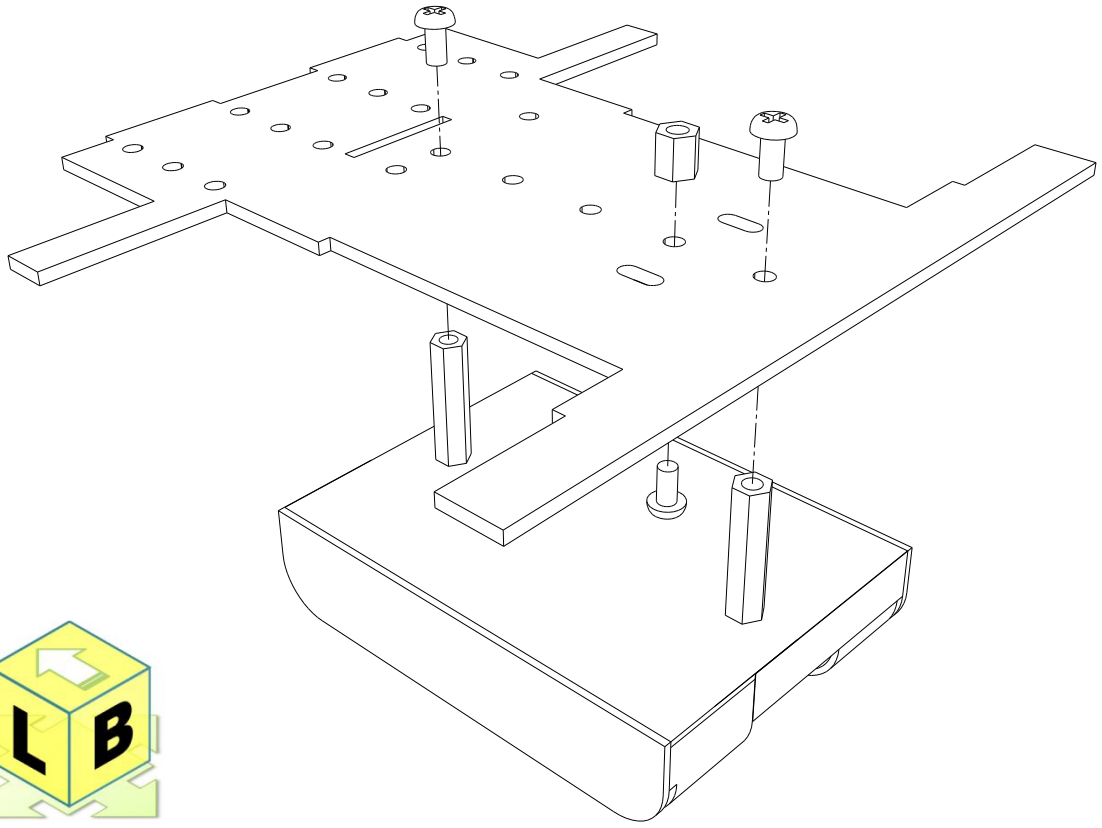
X2

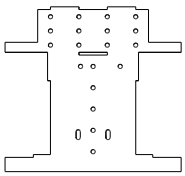


C178
M3x22

X2

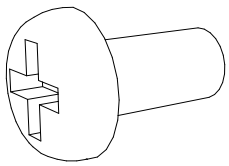
Step 05





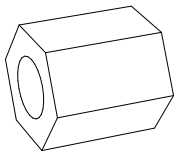
P201
Plexiglas

X1



C122
M3x6

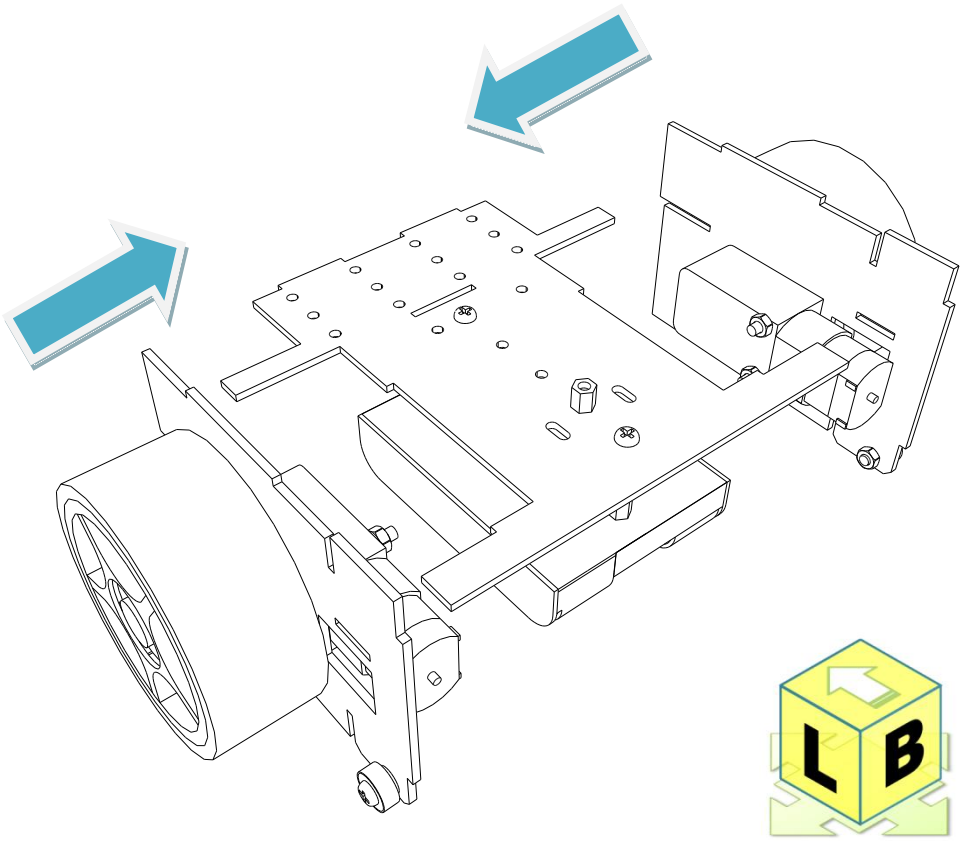
X3

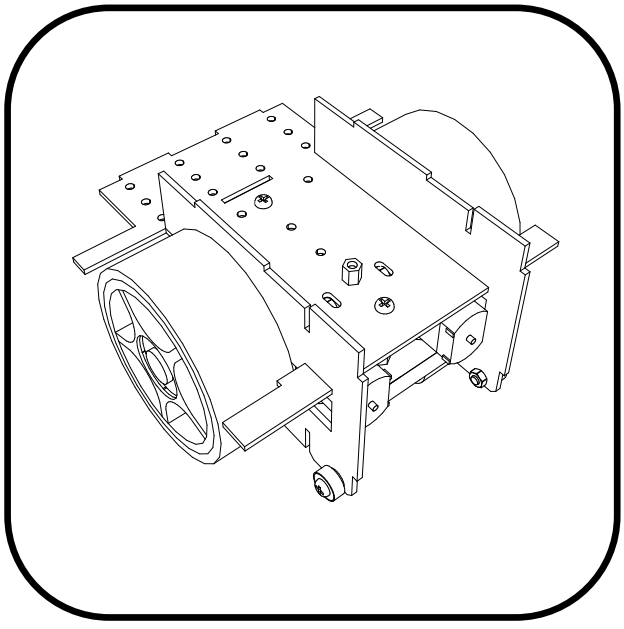


C171
M3x6

X1

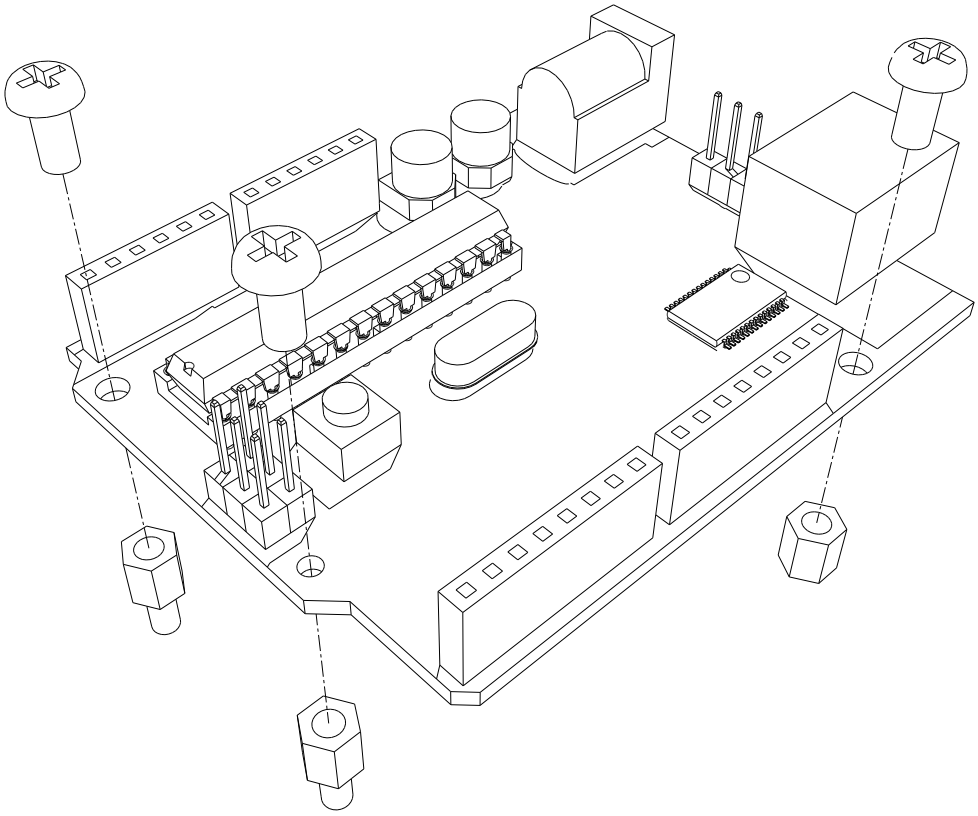
Step 06

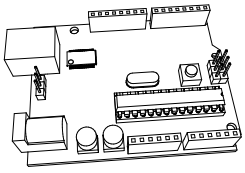




Step 07

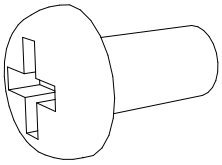
From this step to step 10 are used for the Arduino standard suit, If you have purchase another package suit. Please find more information at the end of this handbook.





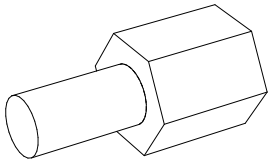
E201
Arduino

X1



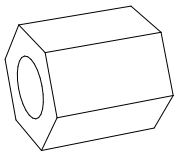
C122
M3x6

X3



C182
M3x6+6

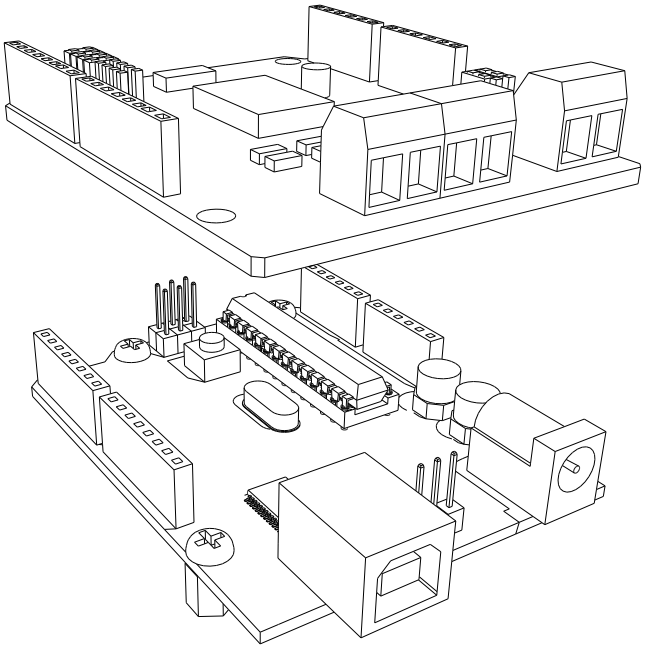
X2

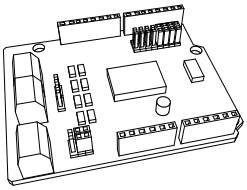


C171
M3x6

X1

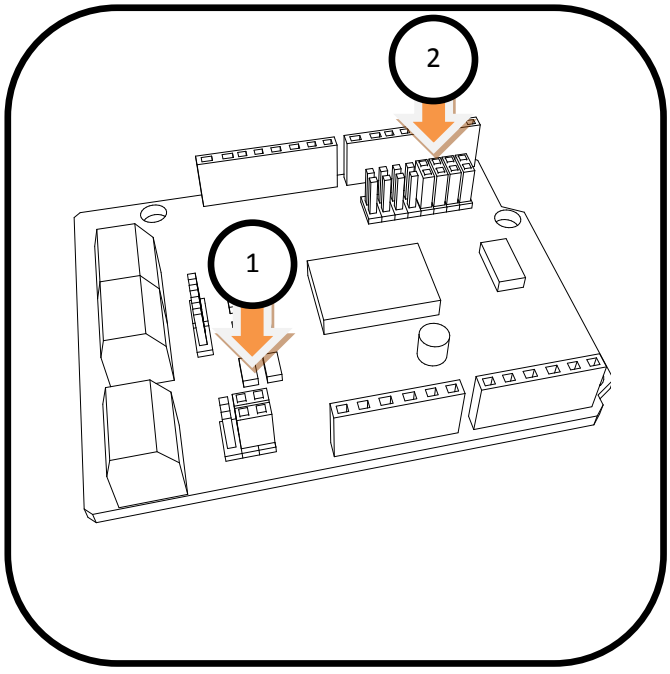
Step 08

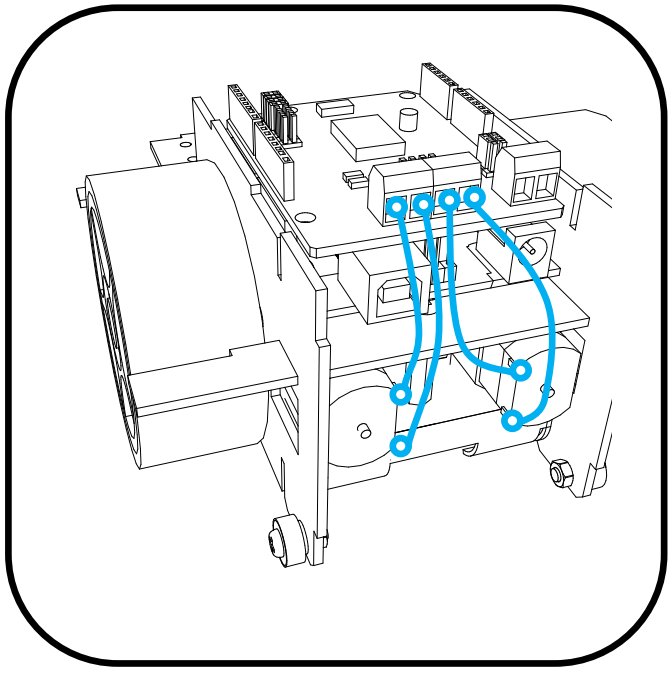




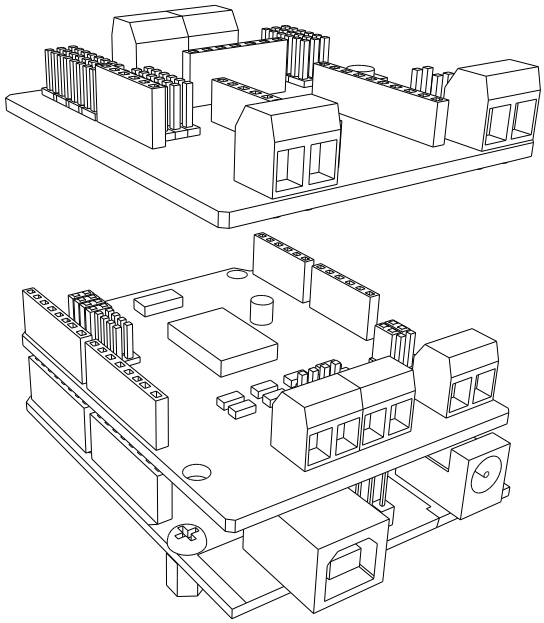
E202
Driver

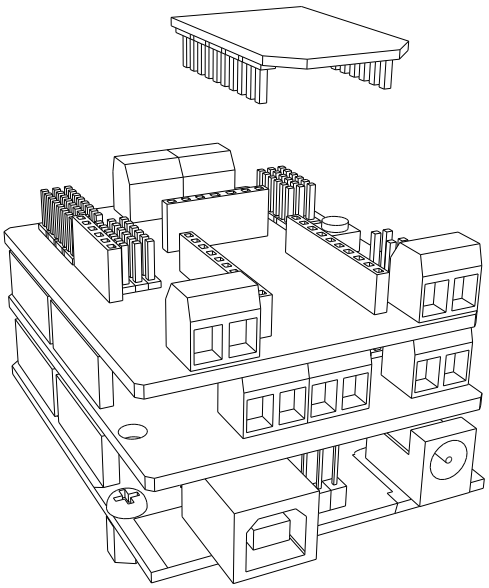
X1

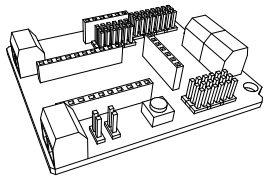




Step 09

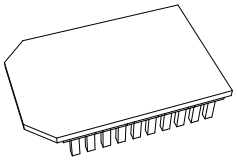






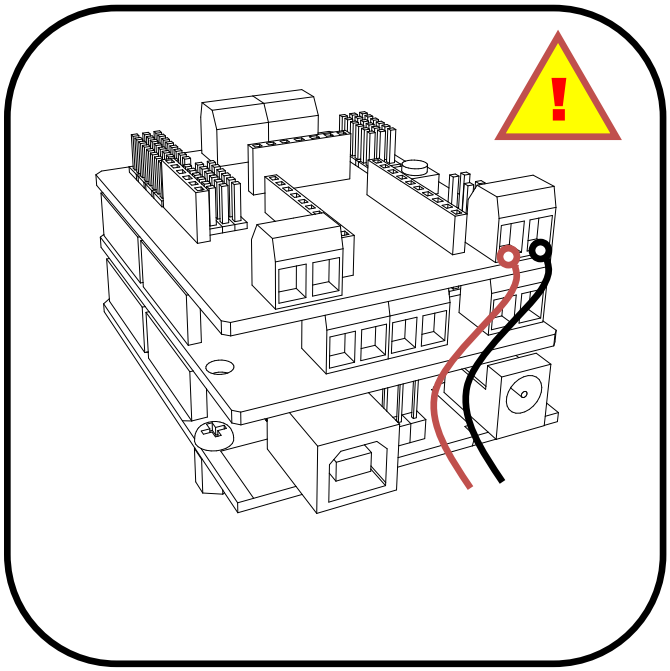
E206
I/O Shield

X1

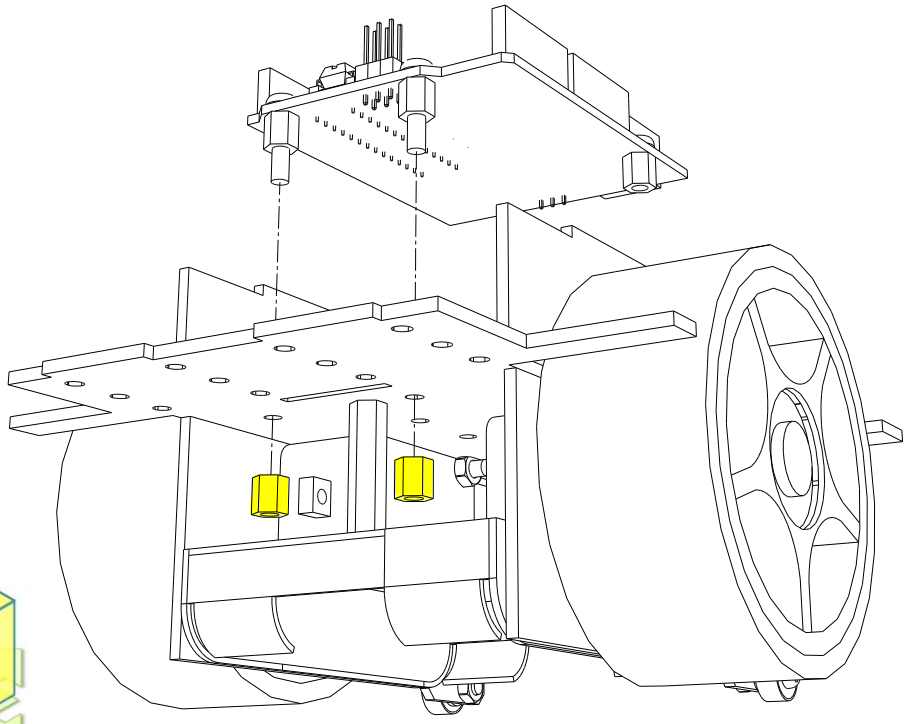


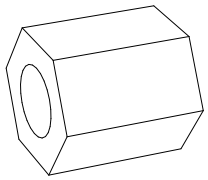
E208
Bluetooth

X1



Step 10



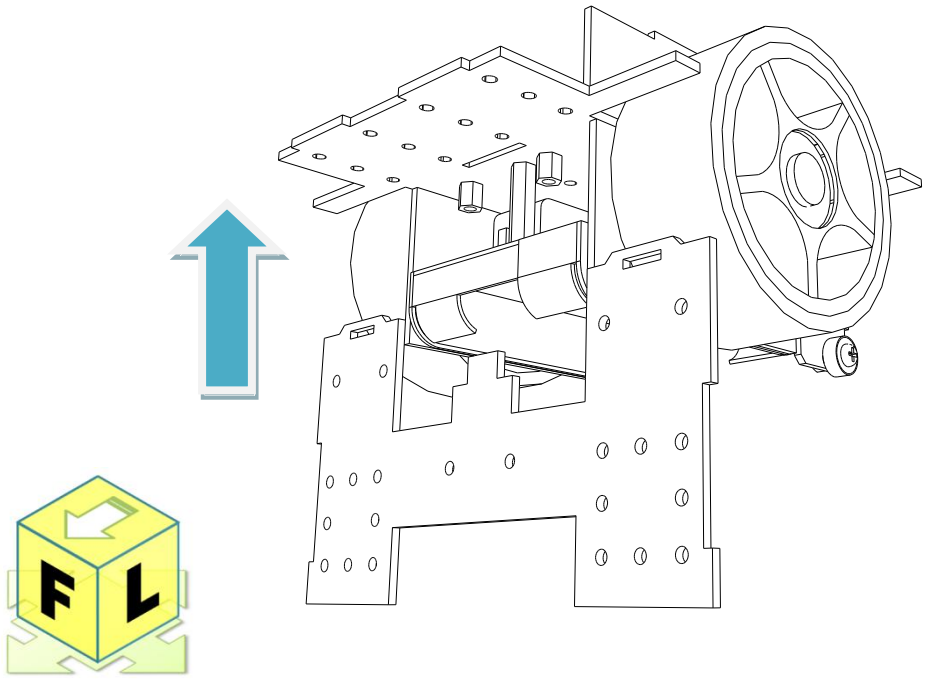


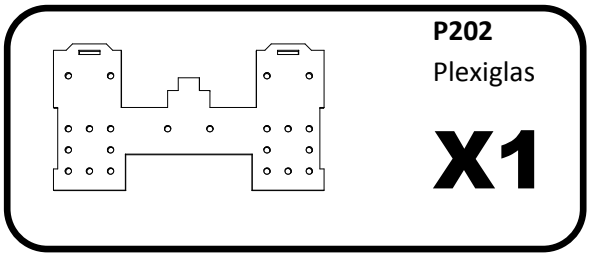
C171

M3x6

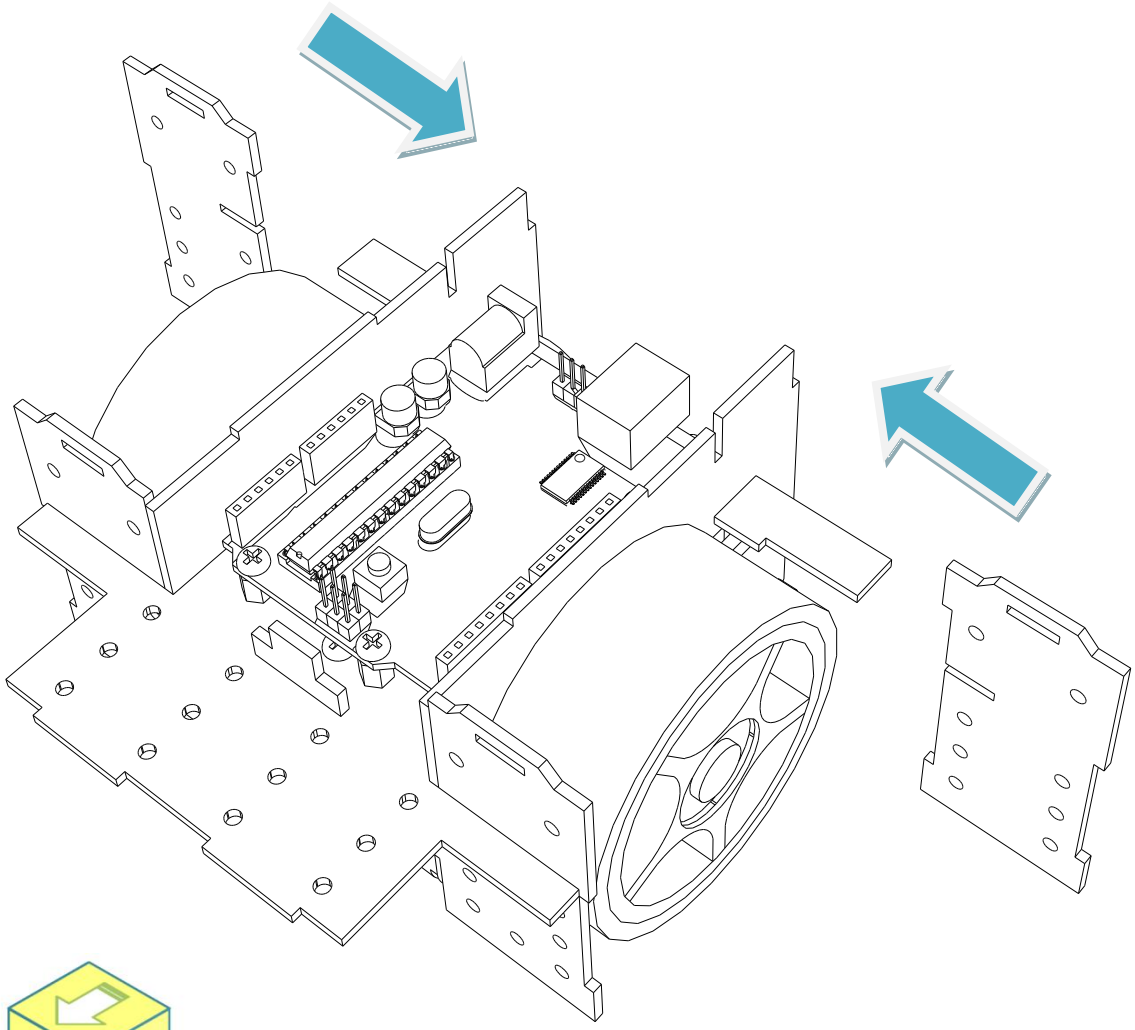
X2

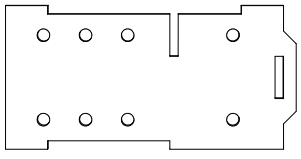
Step 11





Step 12

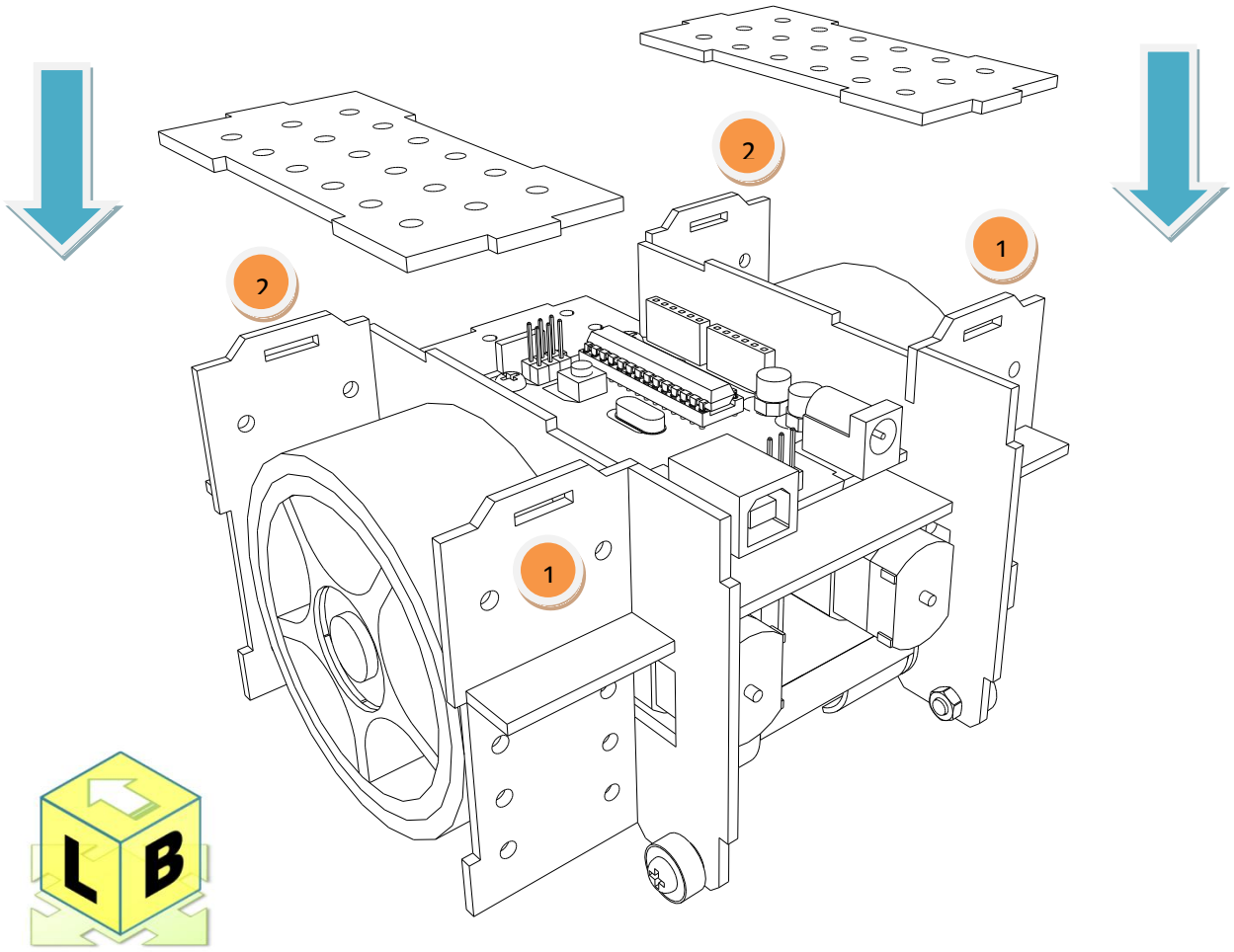


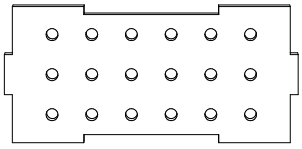


P204
Plexiglas

X2

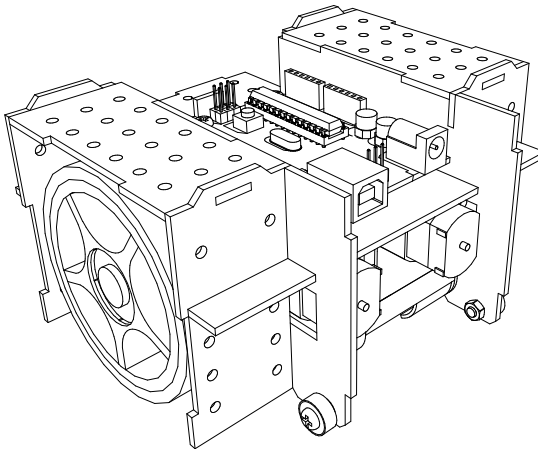
Step 13





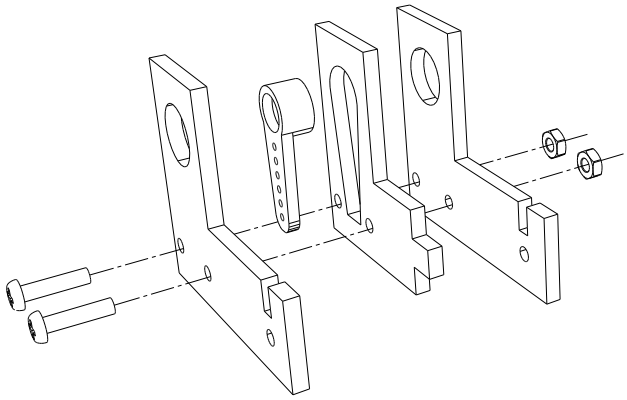
P205
Plexiglas

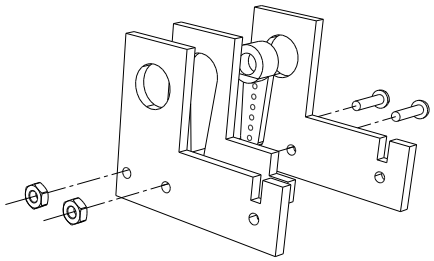
X2

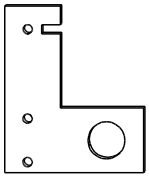


Step 14

From this step to step 16 are used for the football extended package suit, If you have purchase another package suit. Please find more information at the end of this handbook.

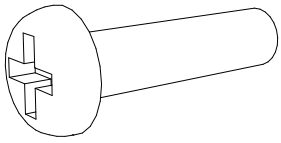






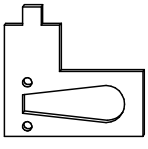
P011
Plexiglas

X4



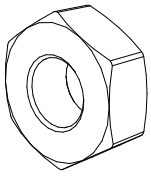
C103
M2x8

X4



P012
Plexiglas

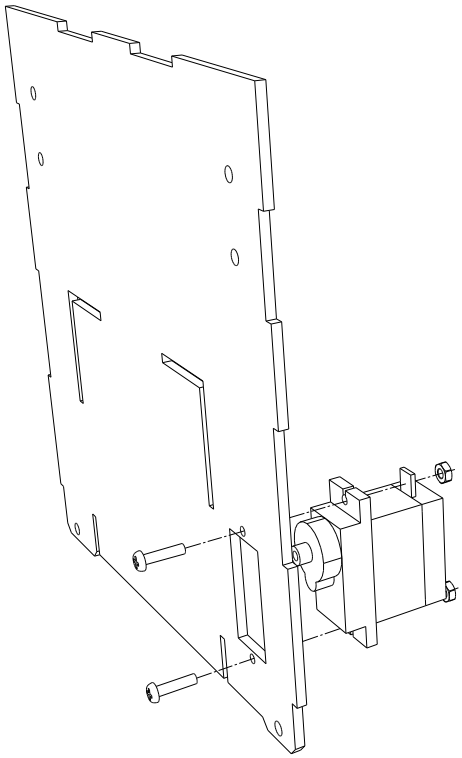
X2

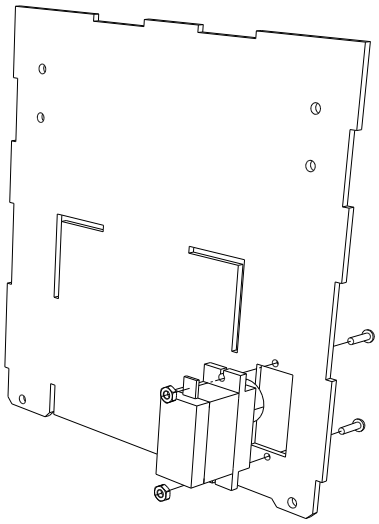


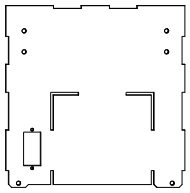
C201
Nut M2

X4

Step 15

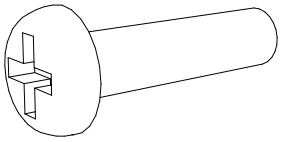






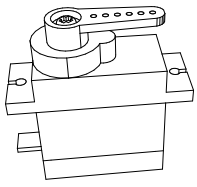
P042
Plexiglas

X2



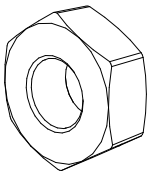
C103
M2x8

X2



C041
Servo 9G

X2

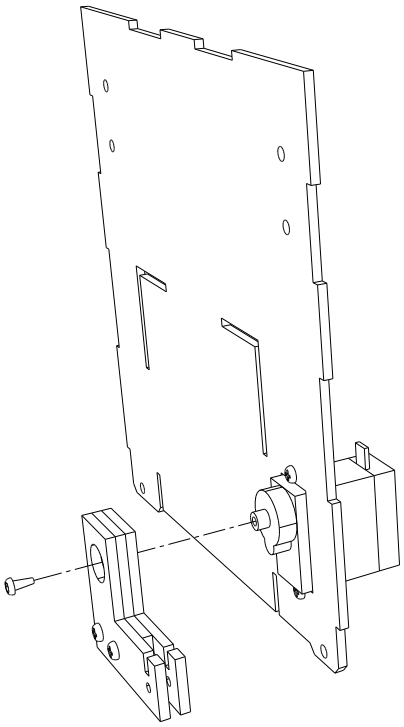


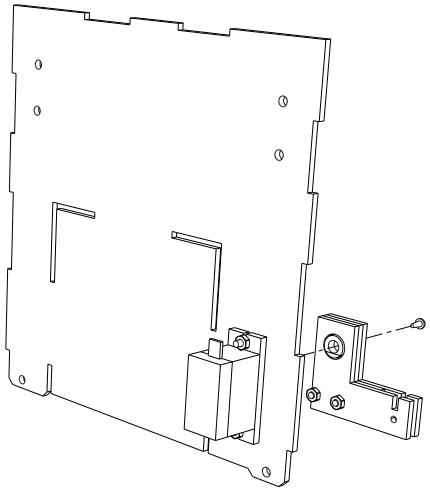
C201
Nut M2

X2

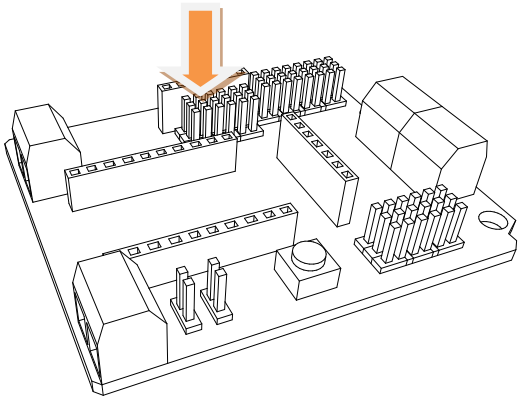
Step 16

Please connect the Left side servo to Pin 9 and right side servo to Pin 10.

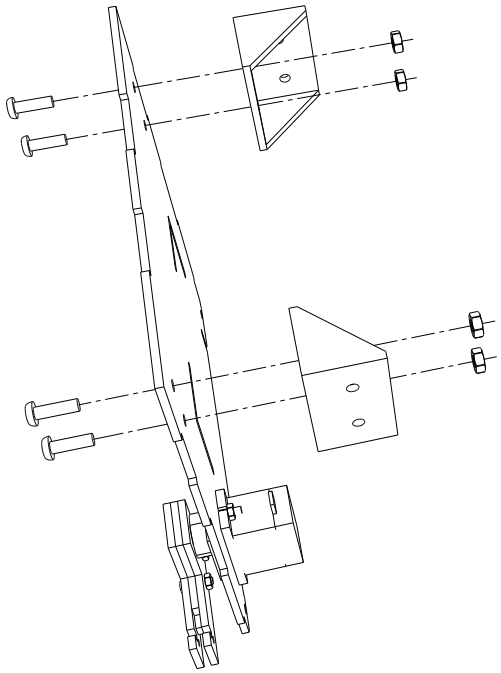


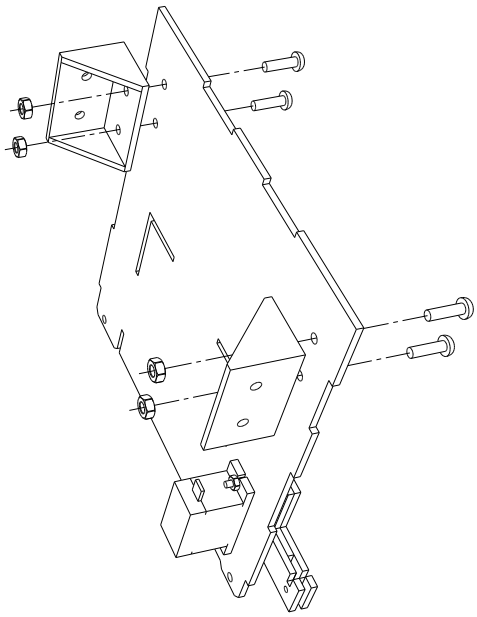


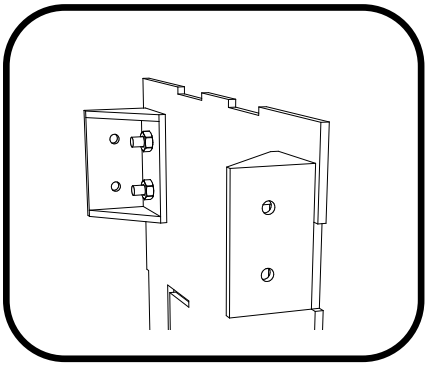
Servor Pin	Color1	Color2
Signal	White	Orange
Power 5V	Red	Red
GND	Black	Brown

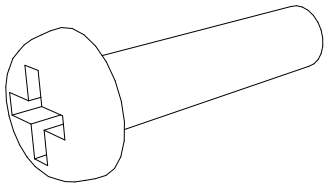


Step 17



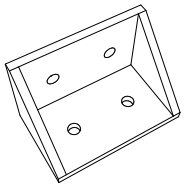






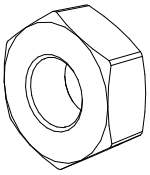
C115
M3x10

X8



C092
PA 19x33

X4

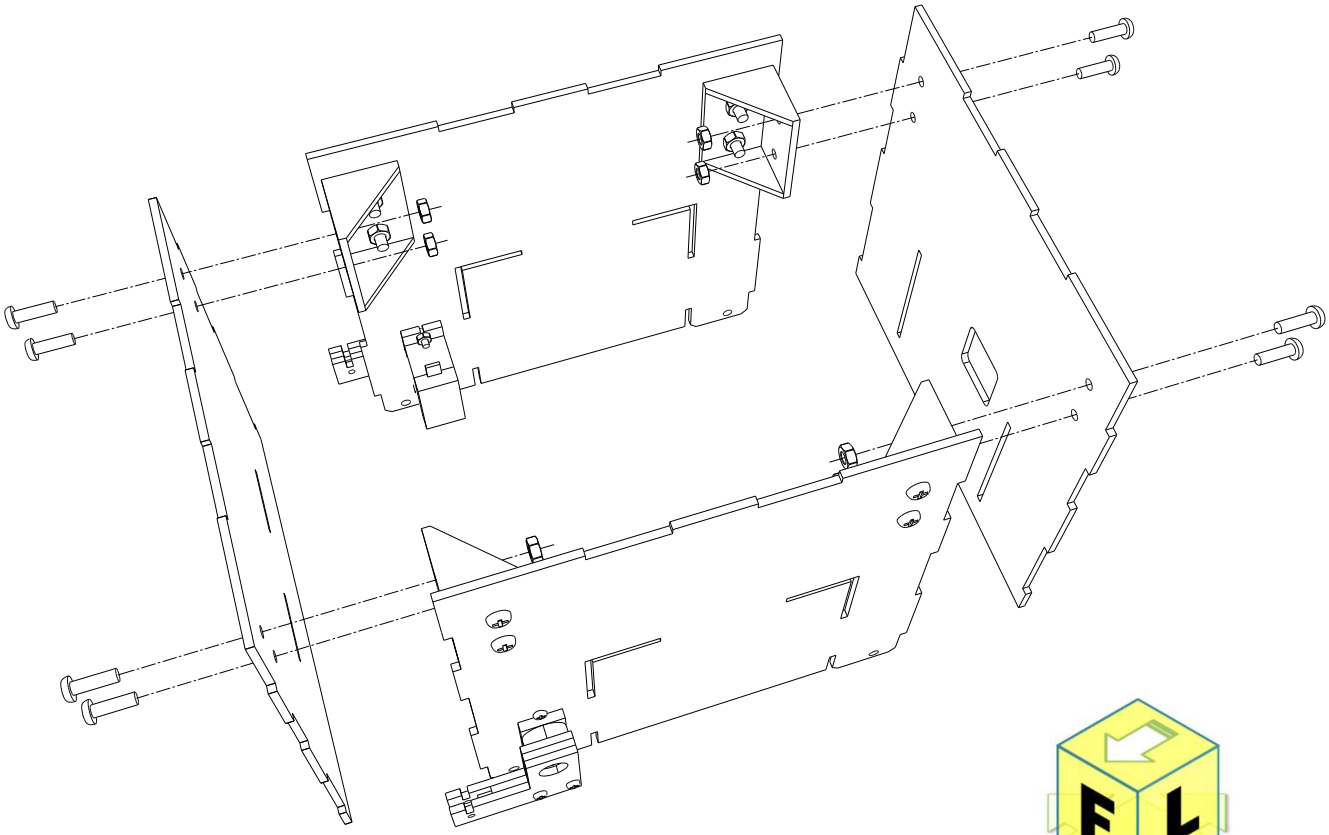


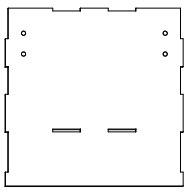
C205
Nut M3

X8

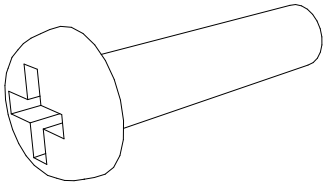
Step 18

Here should let the screw is flexible(about 2 to 3 MM space), do not tie too much.

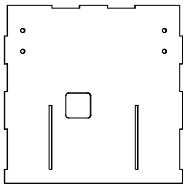




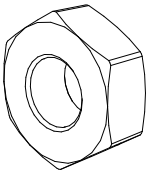
P022
Plexiglas
X4



C115
M3x10
X8

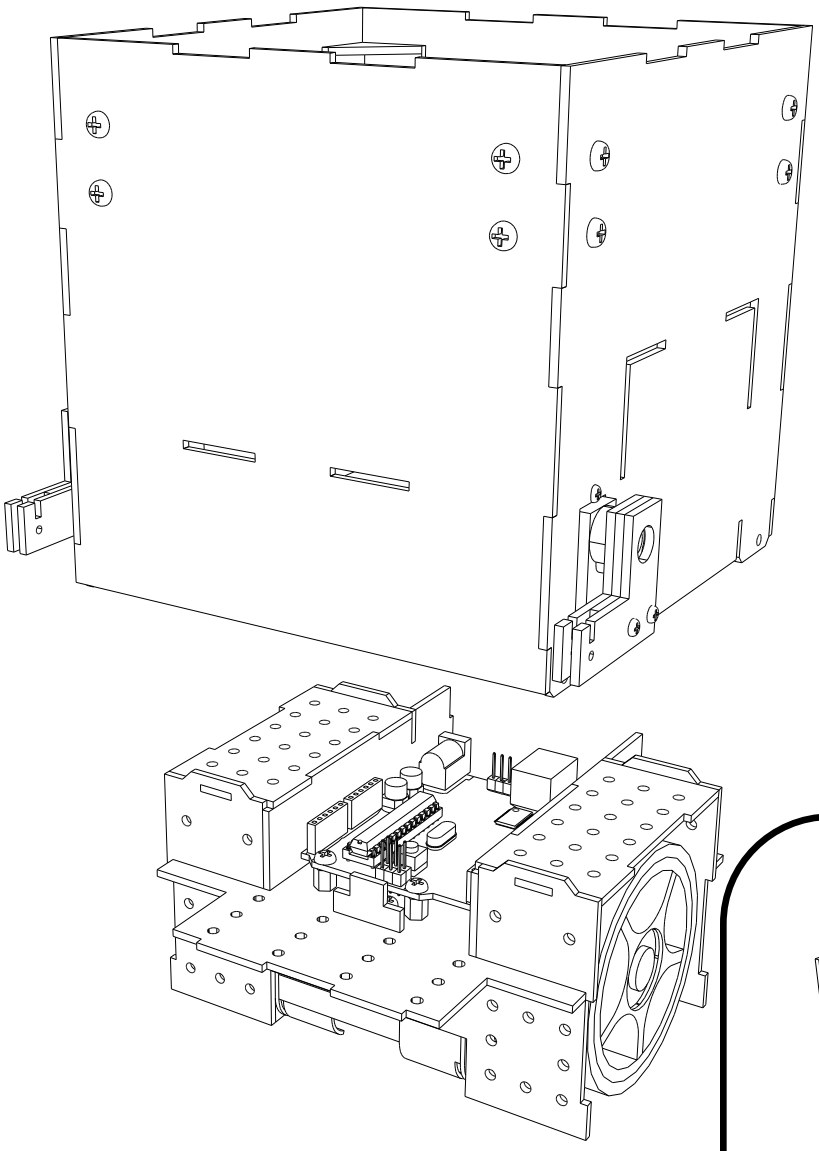


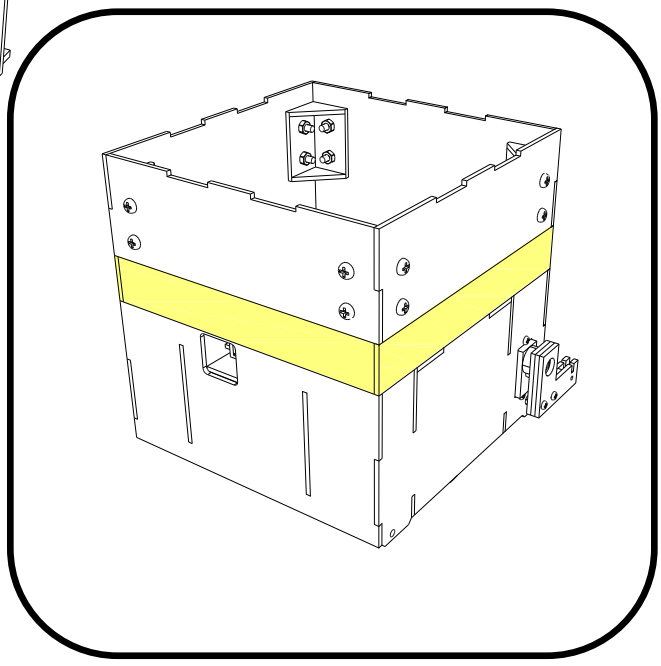
P032
Plexiglas
X4



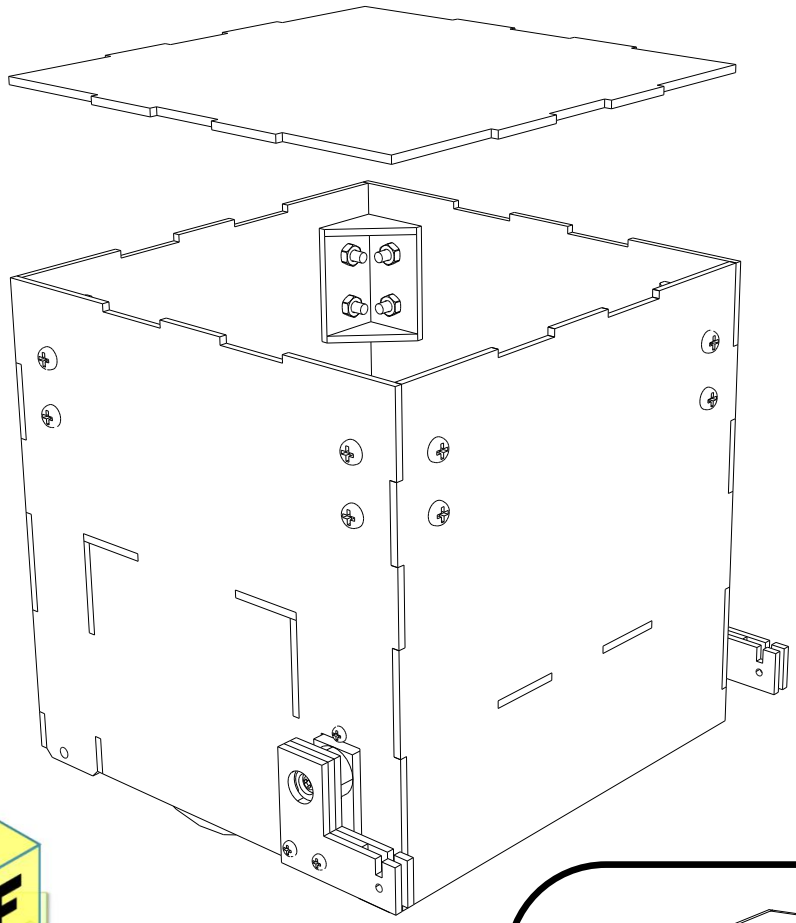
C205
Nut M3
X8

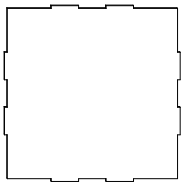
Step 19





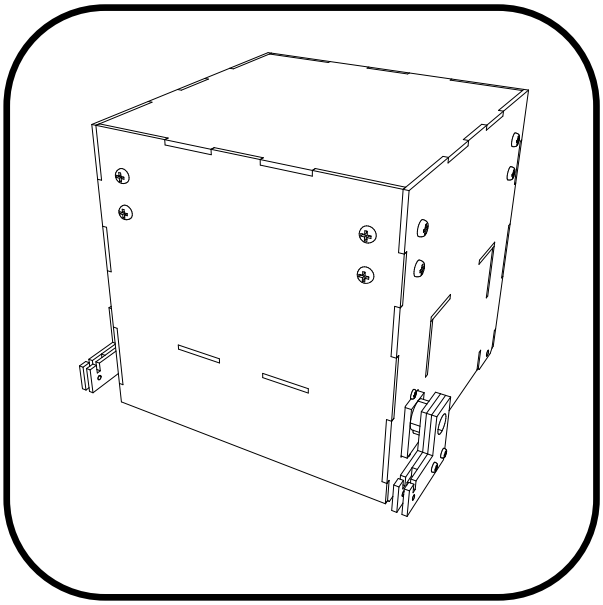
Step 20





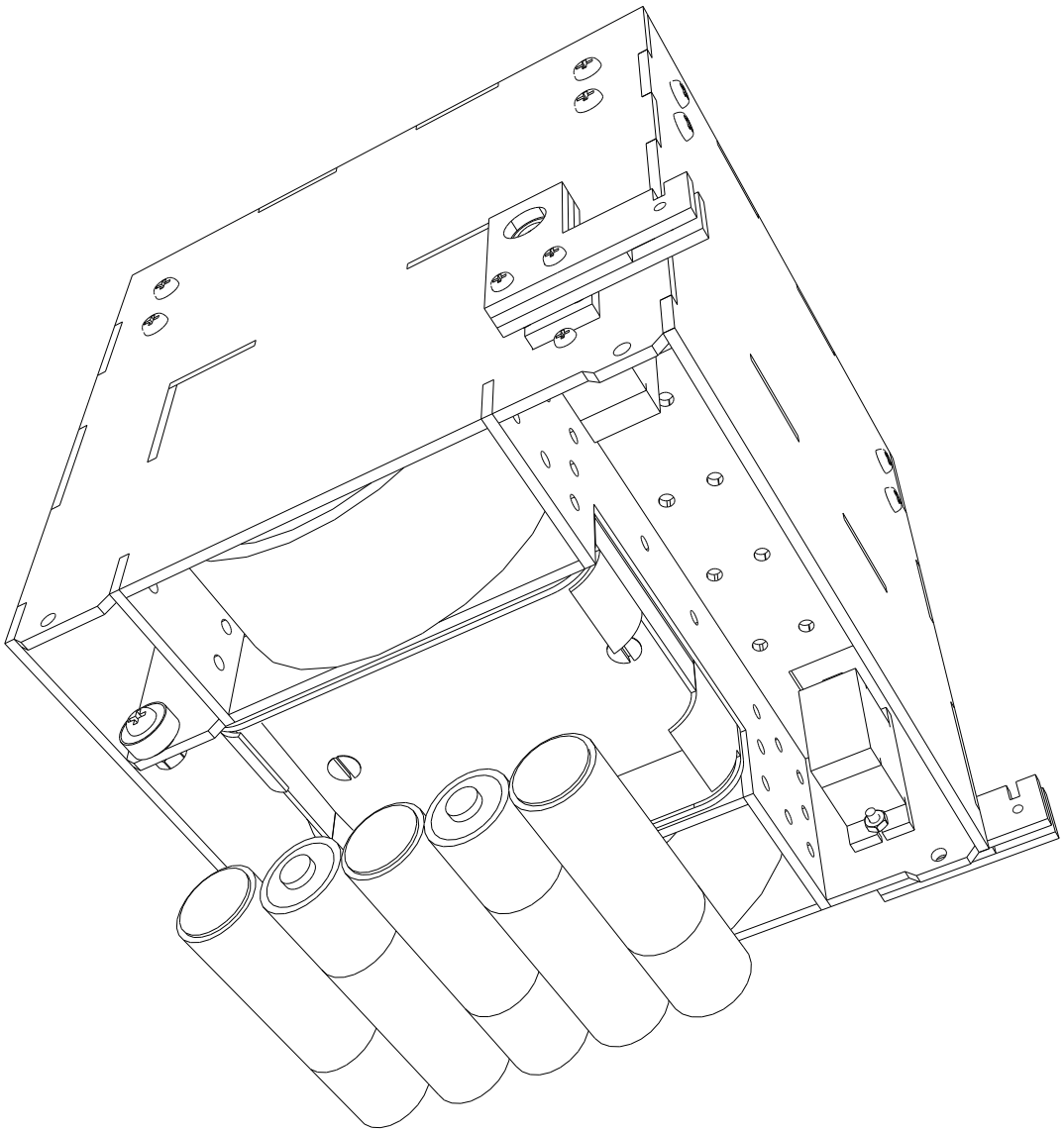
P052
Plexiglass

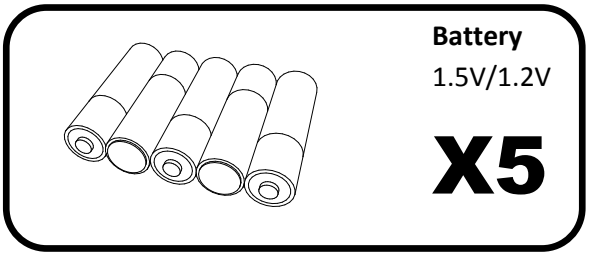
X1



Step 21

Please check all the cable is connected correctly and the jumper is configured correctly, then plug in the battery and Have Fun!





Extended operation

* The following step is used for the assembly of Extended Package which is based on the standard package.

* The other step please refer to the assembly of Standard Package.

Sections 1: Support for DFROBOT ROMEO V2-All in one Controller

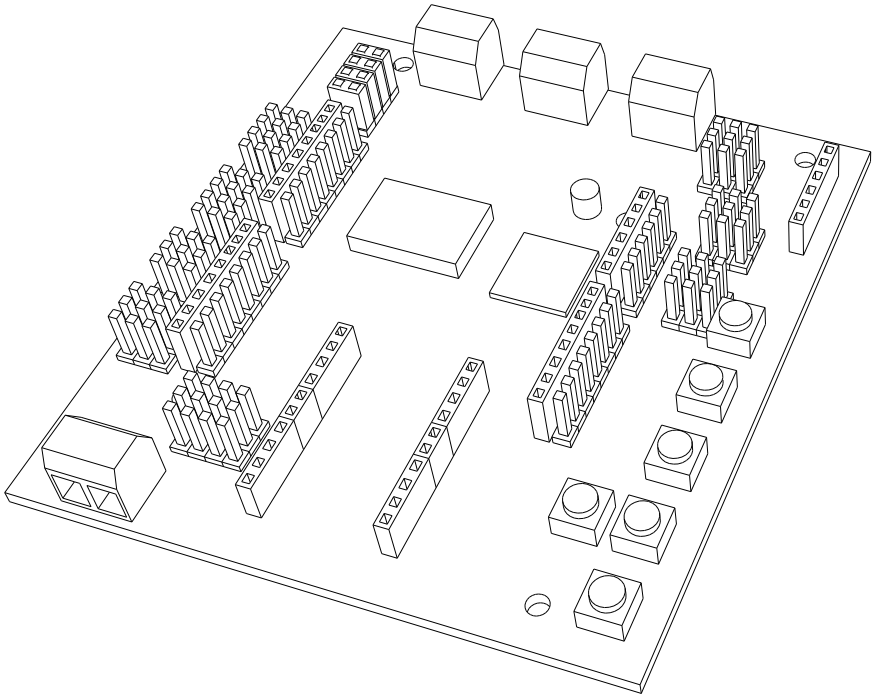
Summary

RoMeo V2[R3]is an All-in-One Arduino compatible microcontroller especially designed for robotics applications from DFRobot. The Romeo benefits from the Arduino open source platform, it is supported by thousands of open source codes, and can easily be expanded with Arduino Shields. The integrated 2 way DC motor driver and Xbee socket allows you to start your project immediatly without the need for an additional motor driver or wirless shield.

The RoMeo V2[R3] behaves like Arduino Leonardo based on the ATmega32u4 chip,You can program it directly from the Arduino IDE 1.0.1 or later version.

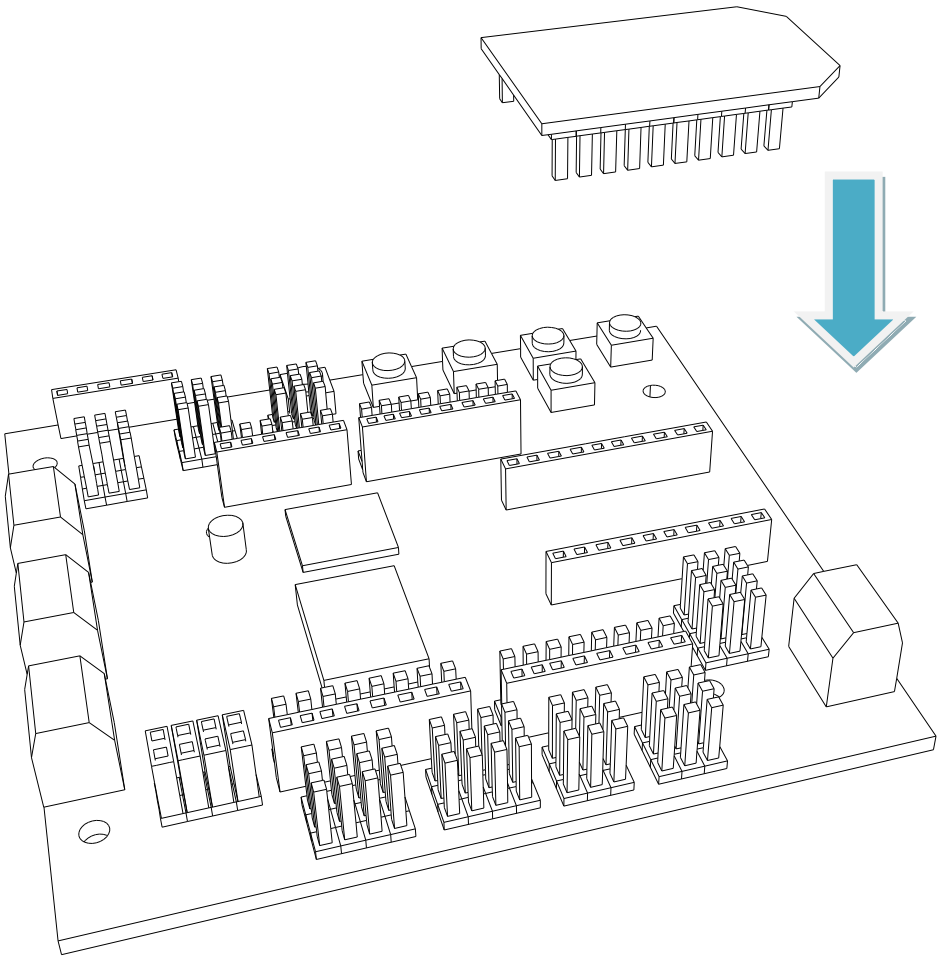
Romeo V2 also improves the power supply, it has now a switch to select power source either from USB or external power.

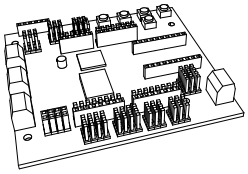
Warning:The analog sensor port pin mapping on RoMeo v2 is different from the old version. Please select Arduino Leonardo board when using Arduino IDE.



For more detail information, please visit WWW.DFROBOT.COM and search “ROMEO”

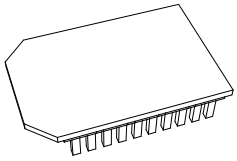
Step 01





E206
ROMEO

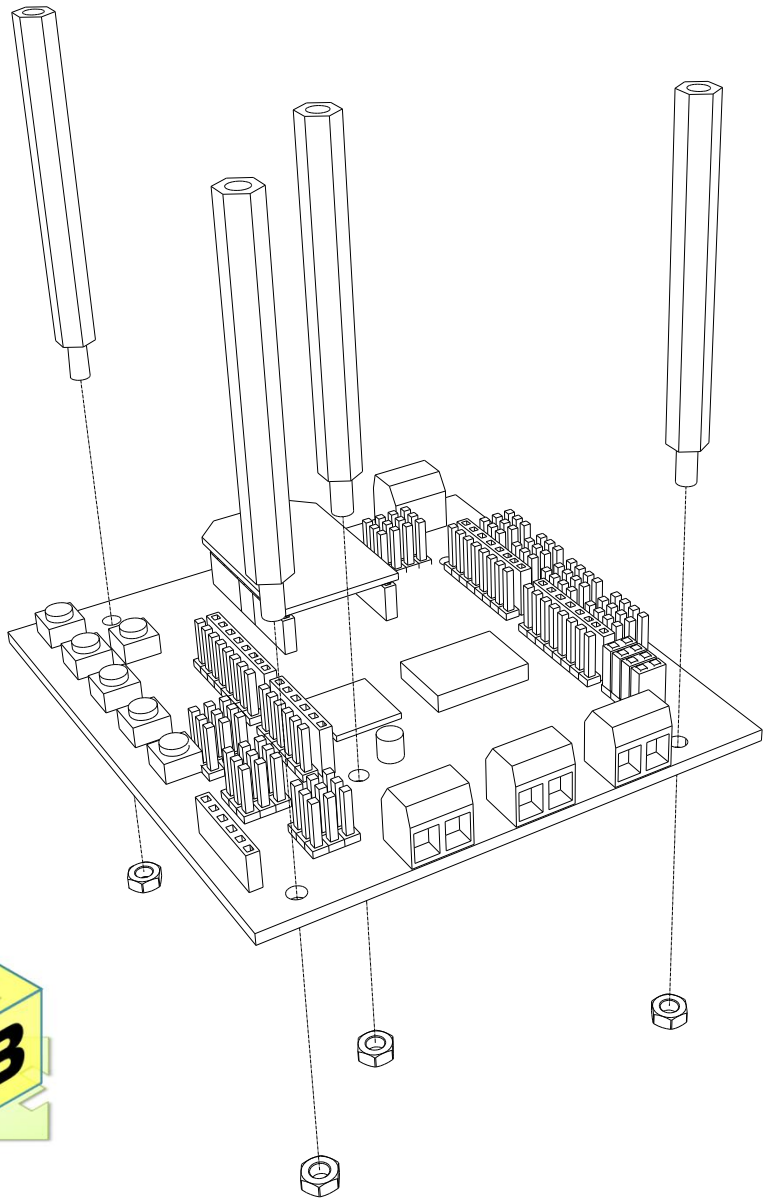
X1

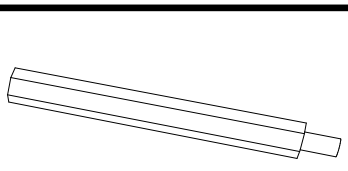


E207
BLE BEE

X1

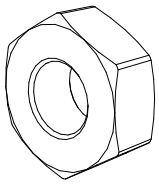
Step 02





C179
M3x30+6

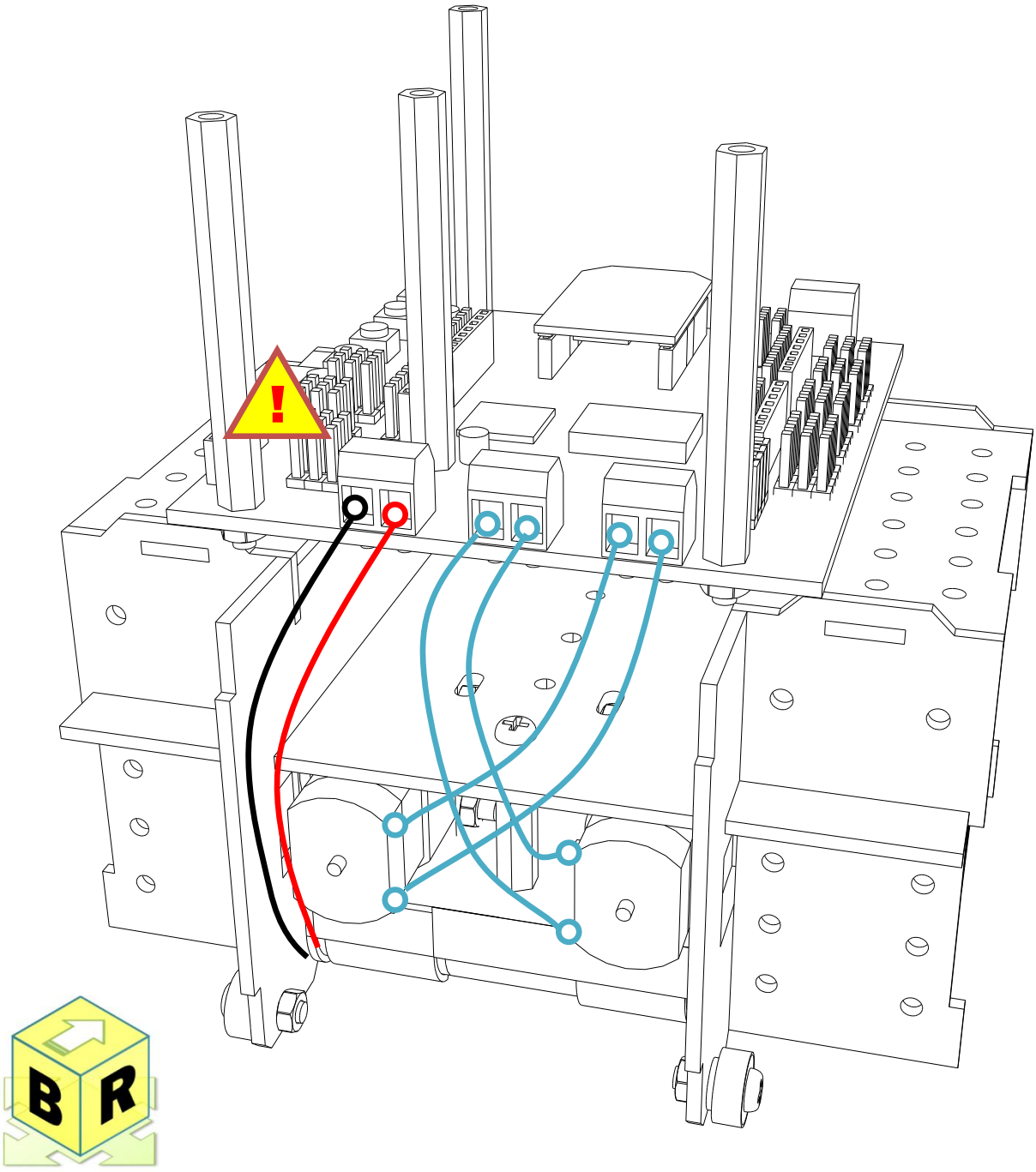
X4



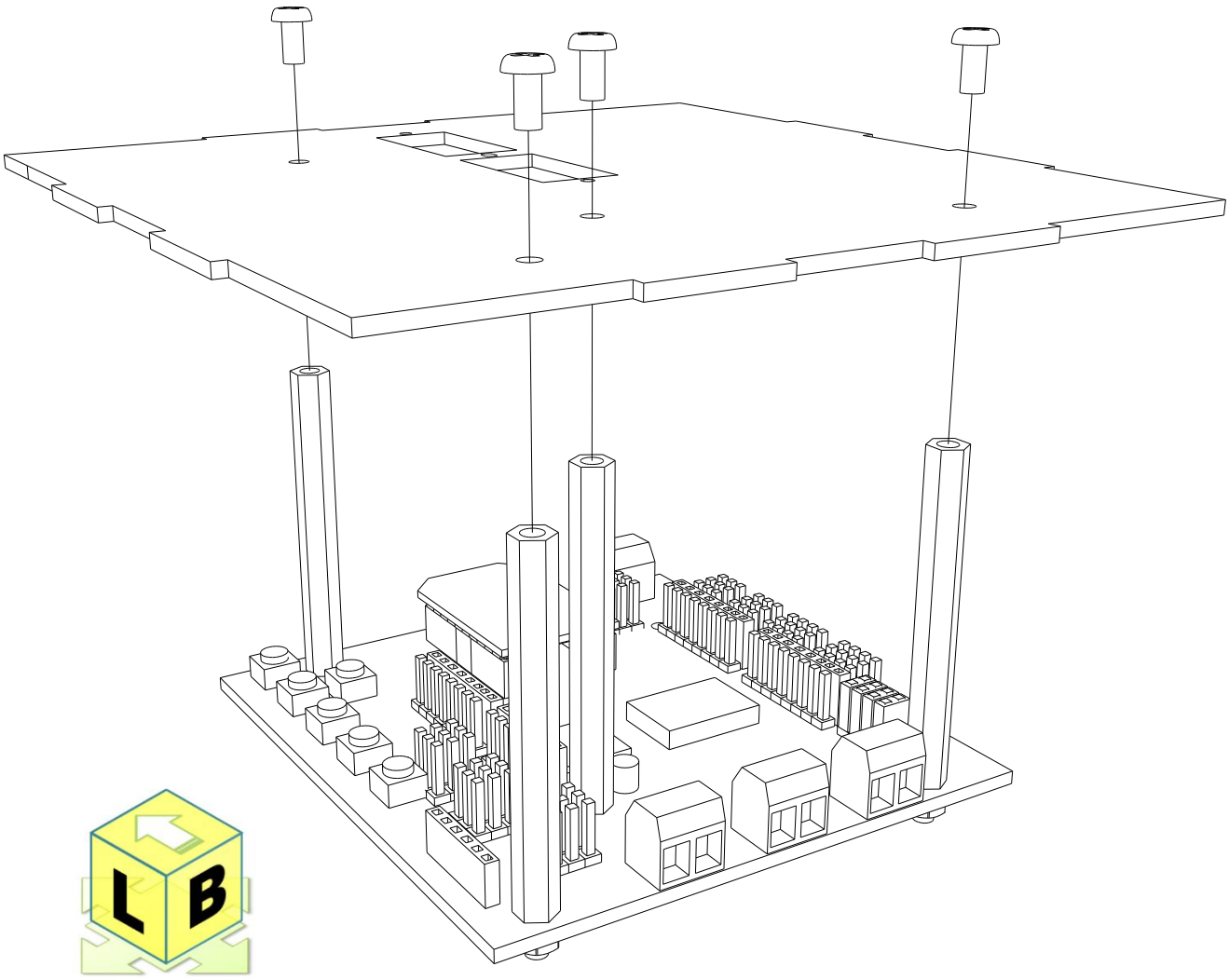
C205
Nut M3

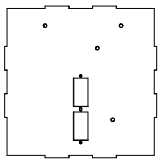
X4

Step 03



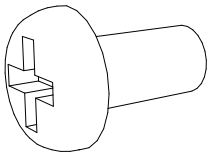
Step 04





P052
Plexiglas

X1



C122
M3x6

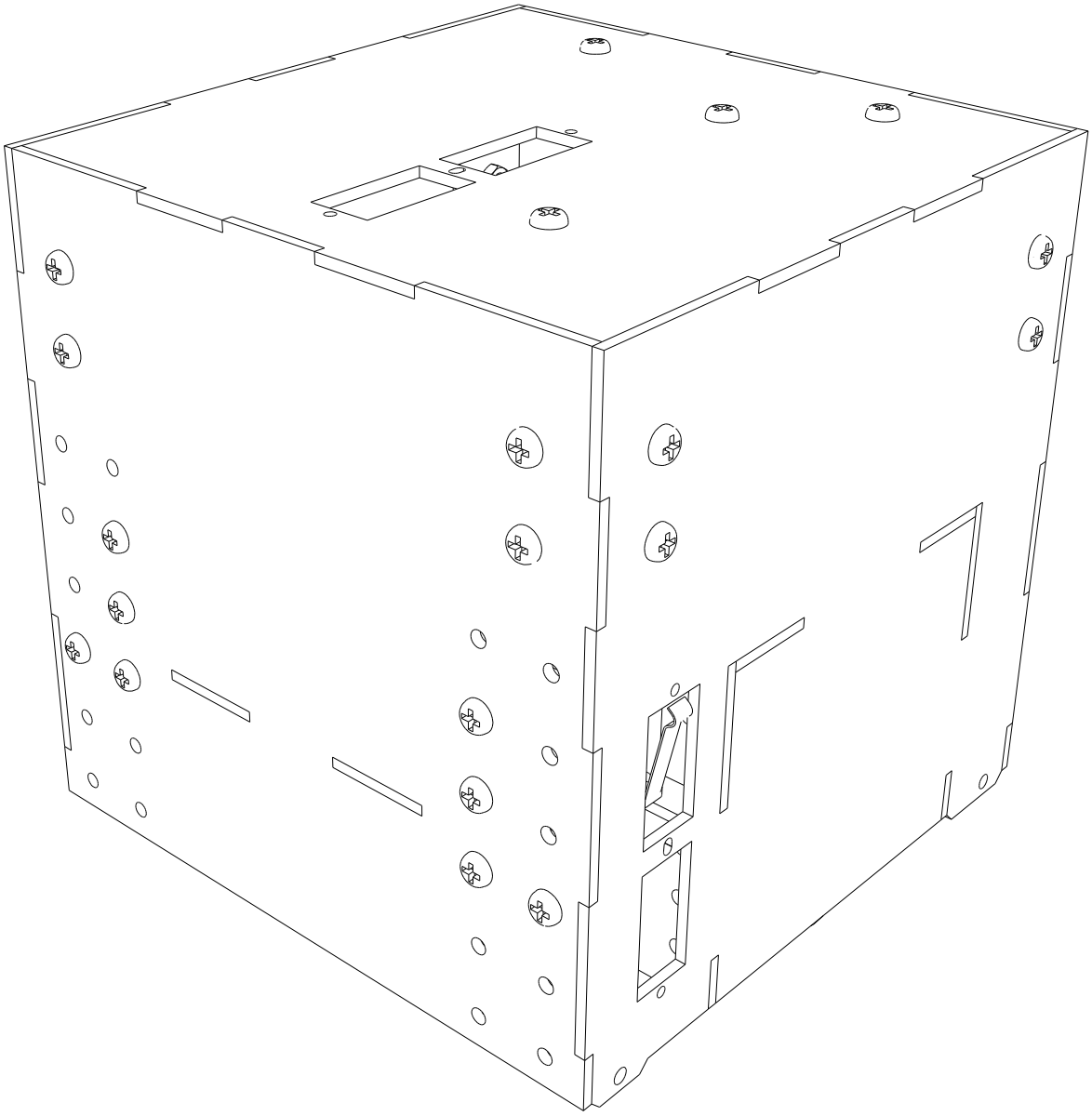
X4

Sections 2: Support for Dodgem

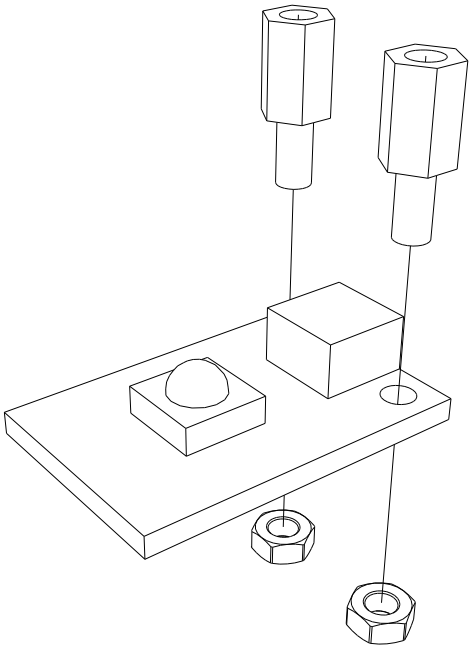
Summary

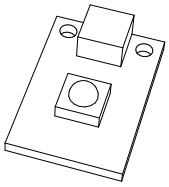
Dodgem is the second application of BOXZ Pro which is base on the standard package suit.(Football Extended Package is the first.) We could control our BOXZ by mobile phone or pad.

There are two limit switch installed at the side of BOXZ. They will check any crash action and reduce the HP of BOXZ. Also the LED around of BOXZ will light on. We could read the status of HP on the controller's screen. There is a HP Bar, and range is from 1 to 100, If the HP less than 1. The game over and have to restart.



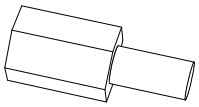
Step 01





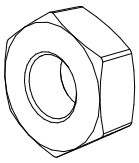
LED
Module

X4



C164
M3x8+6

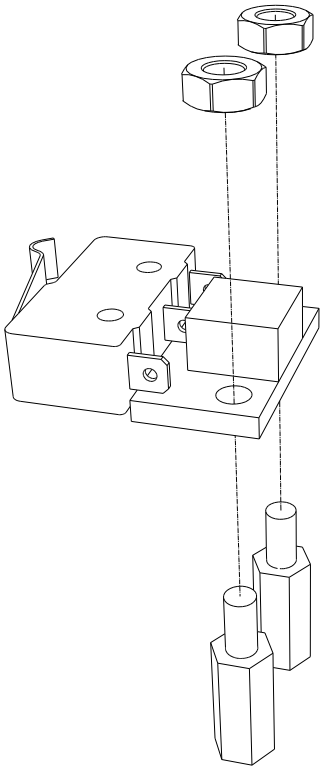
X8

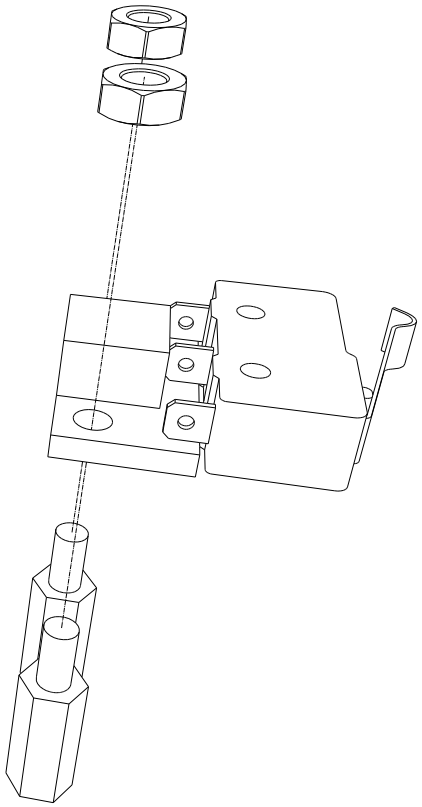


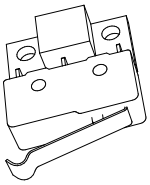
C202
Nut M3

X8

Step 02

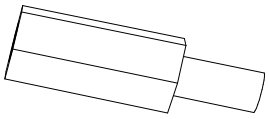






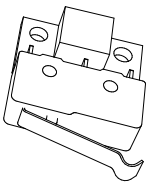
Switch
Left Side

X1



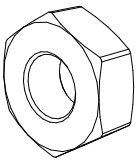
C166
M3x12+6

X4



Switch
Right Side

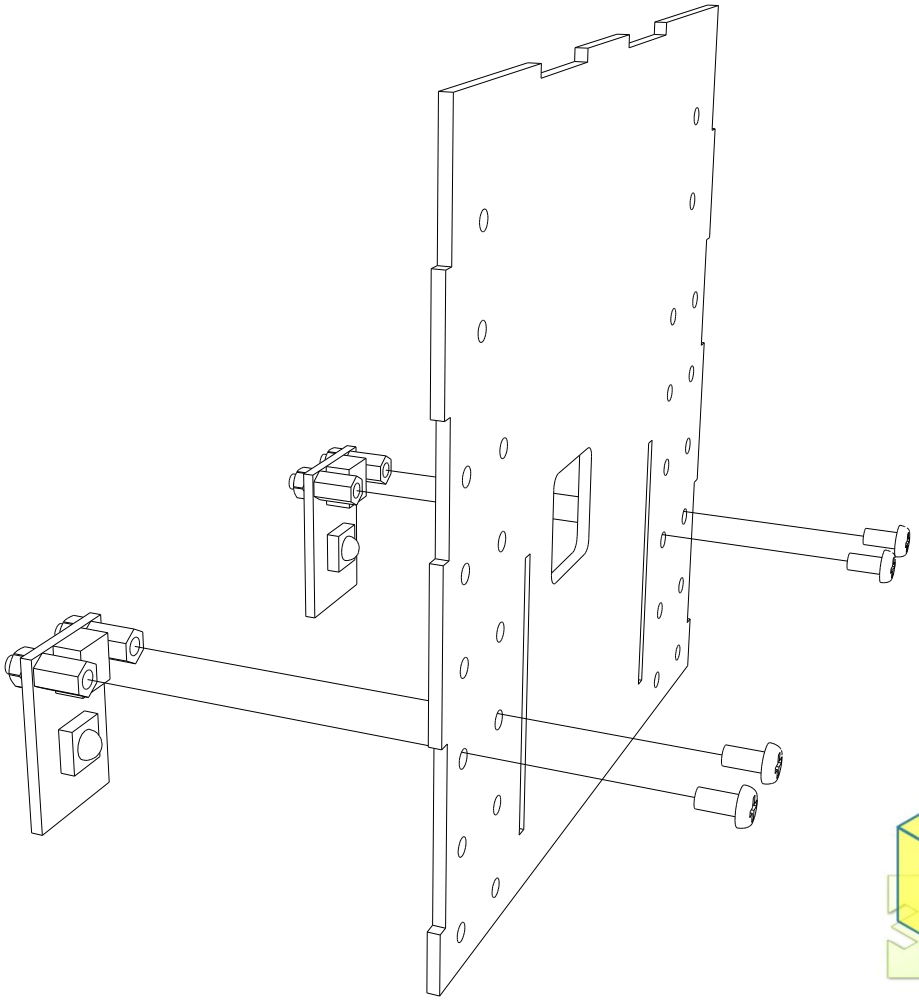
X1

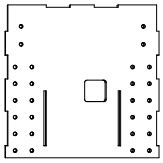


C202
Nut M3

X4

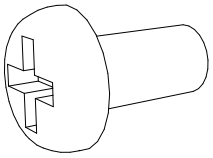
Step 03





P032
Plaxiglas

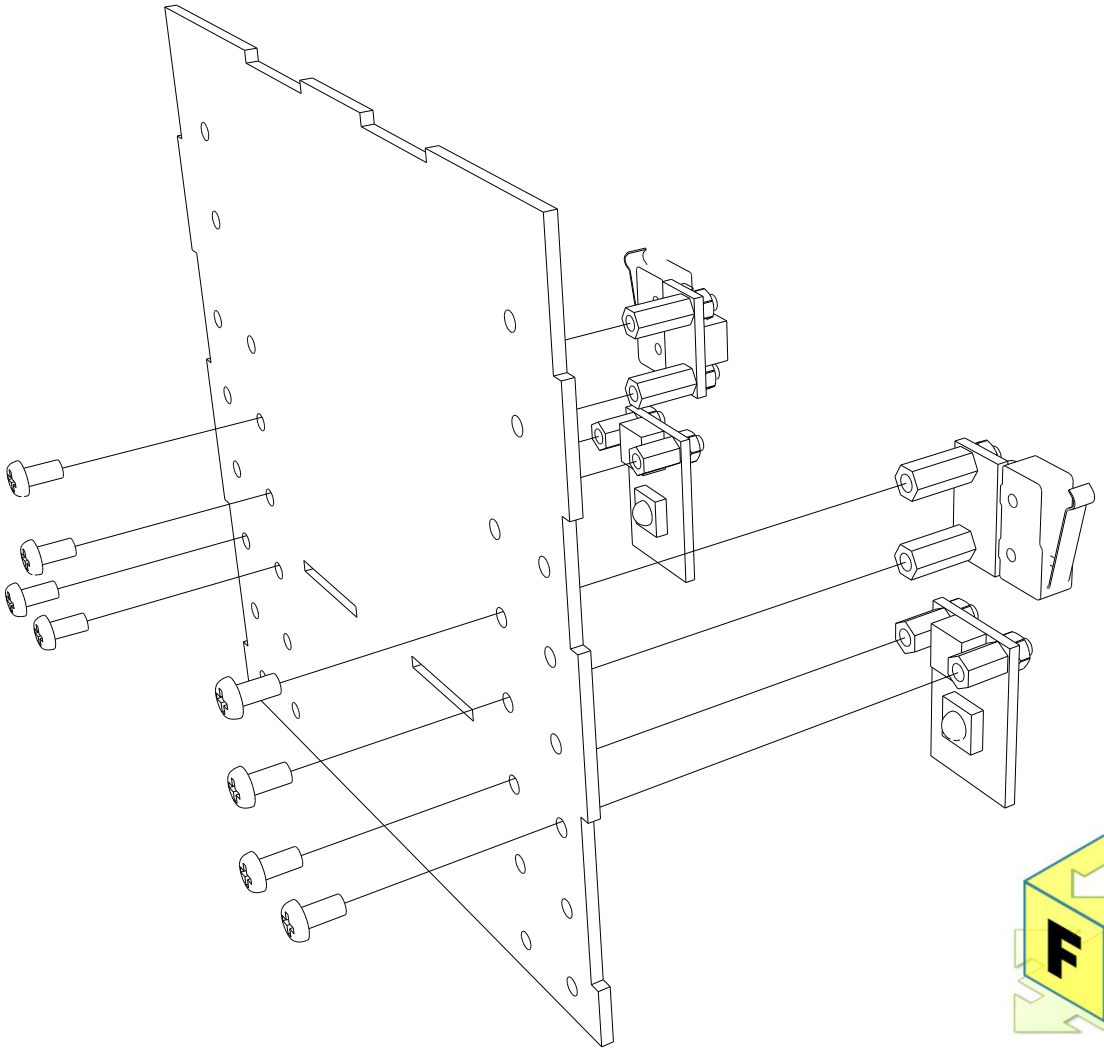
X1

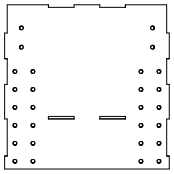


C112
M3x6

X4

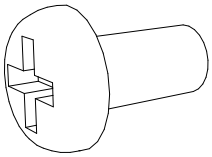
Step 04





P022
Plaxiglas

X1

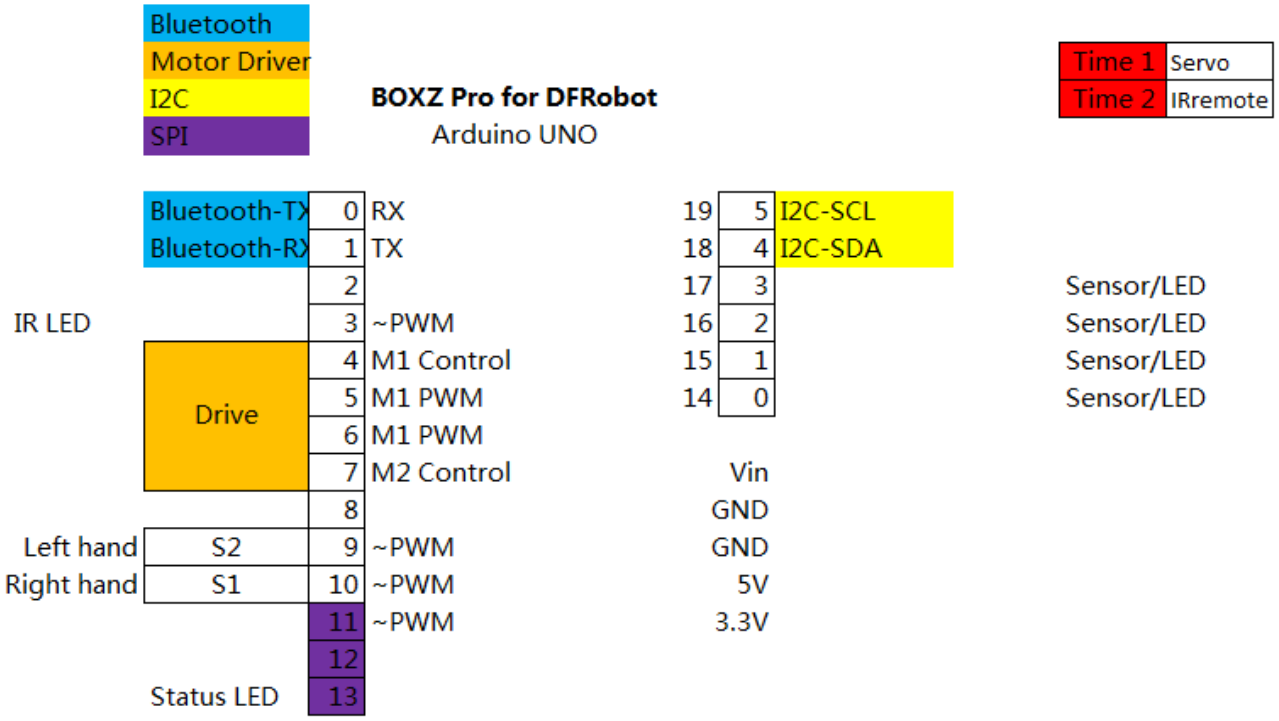


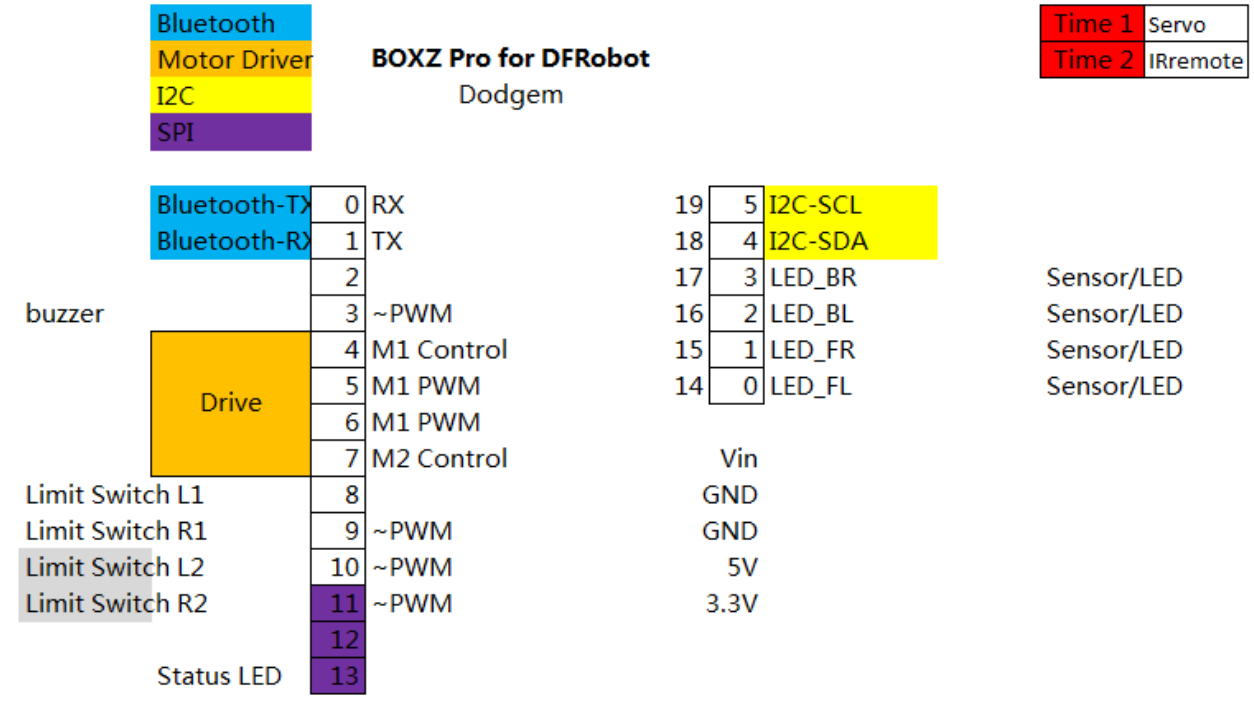
C112
M3x6

X8

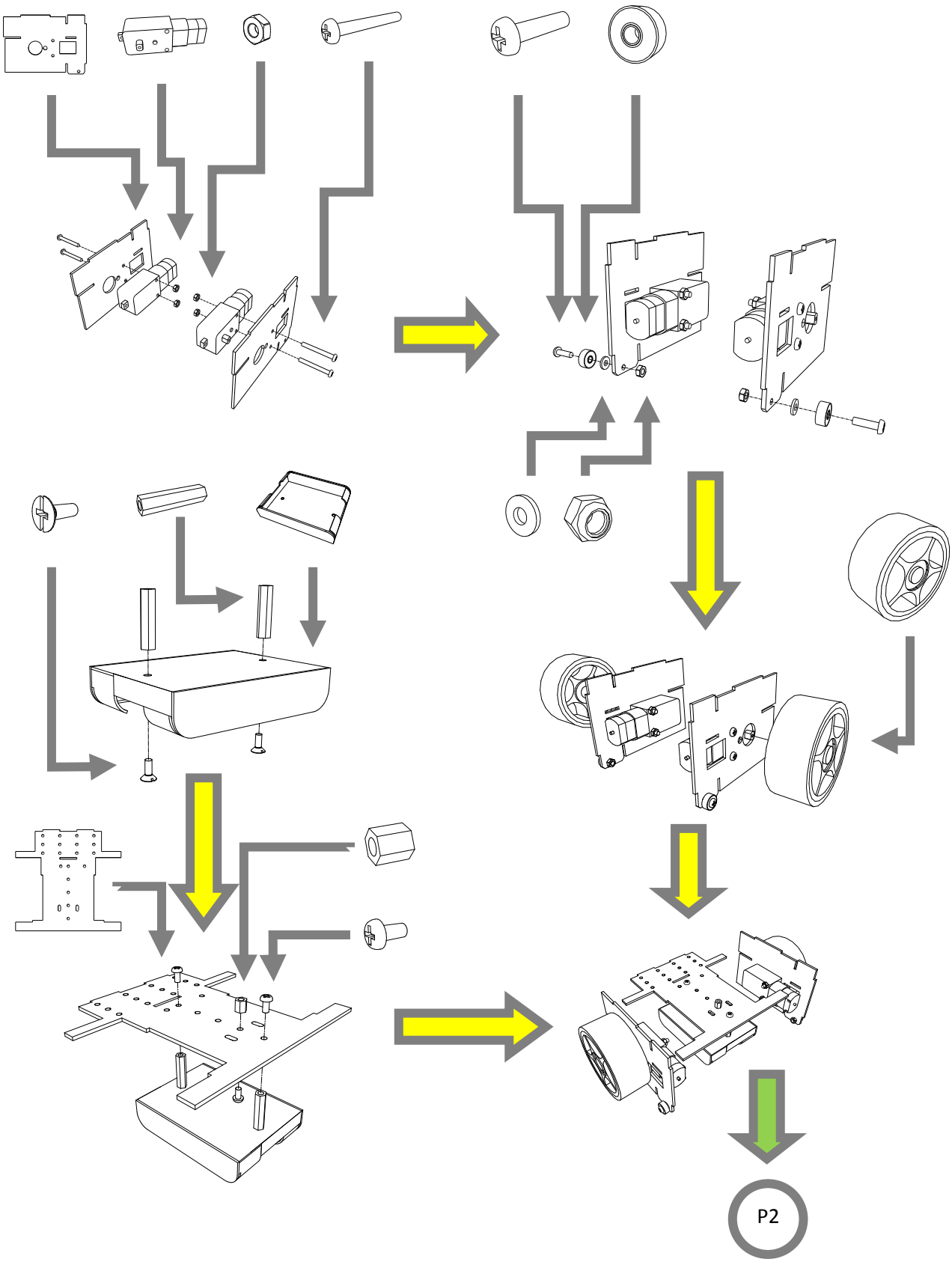
Appendix

IO Define of BOXZ

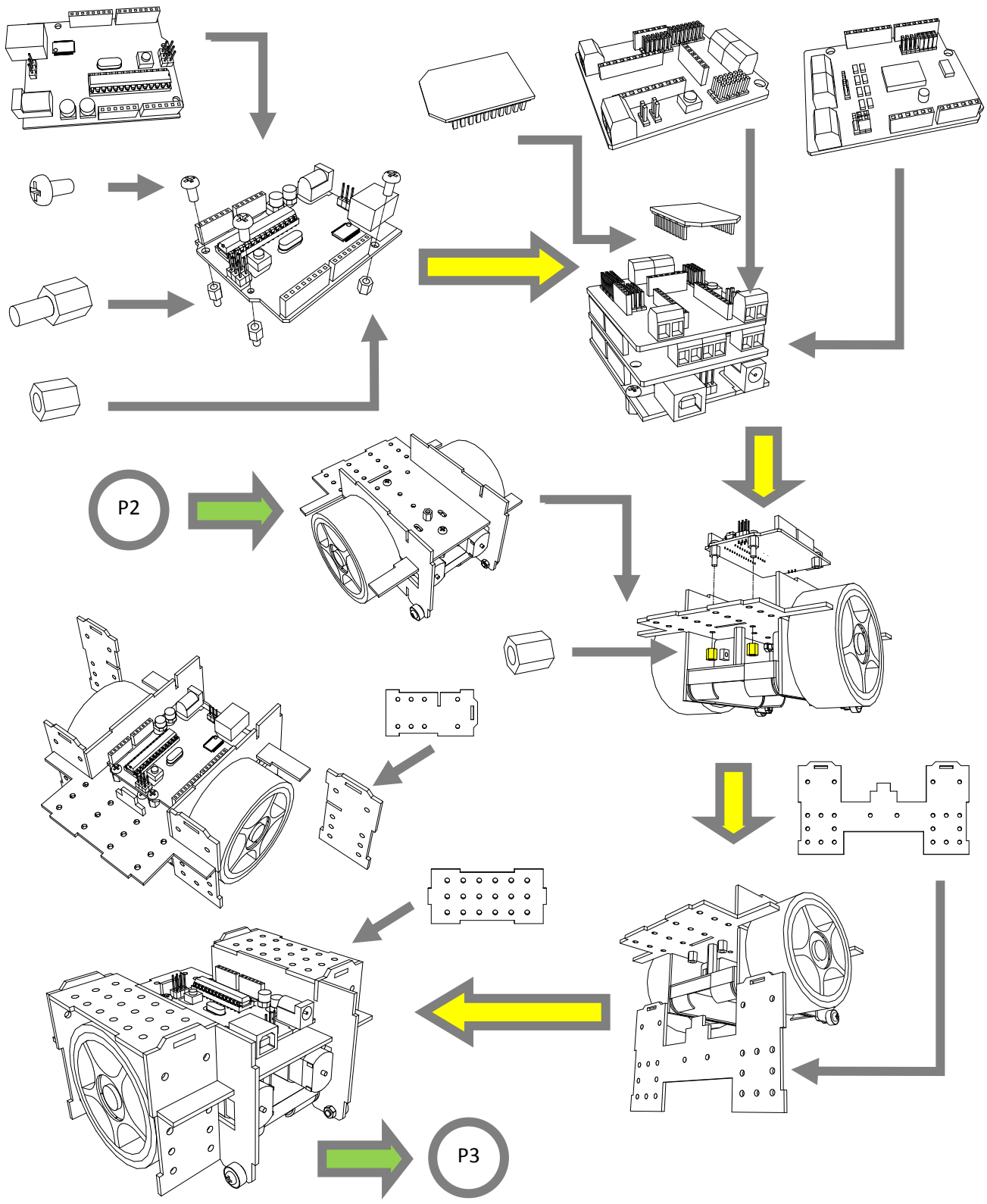




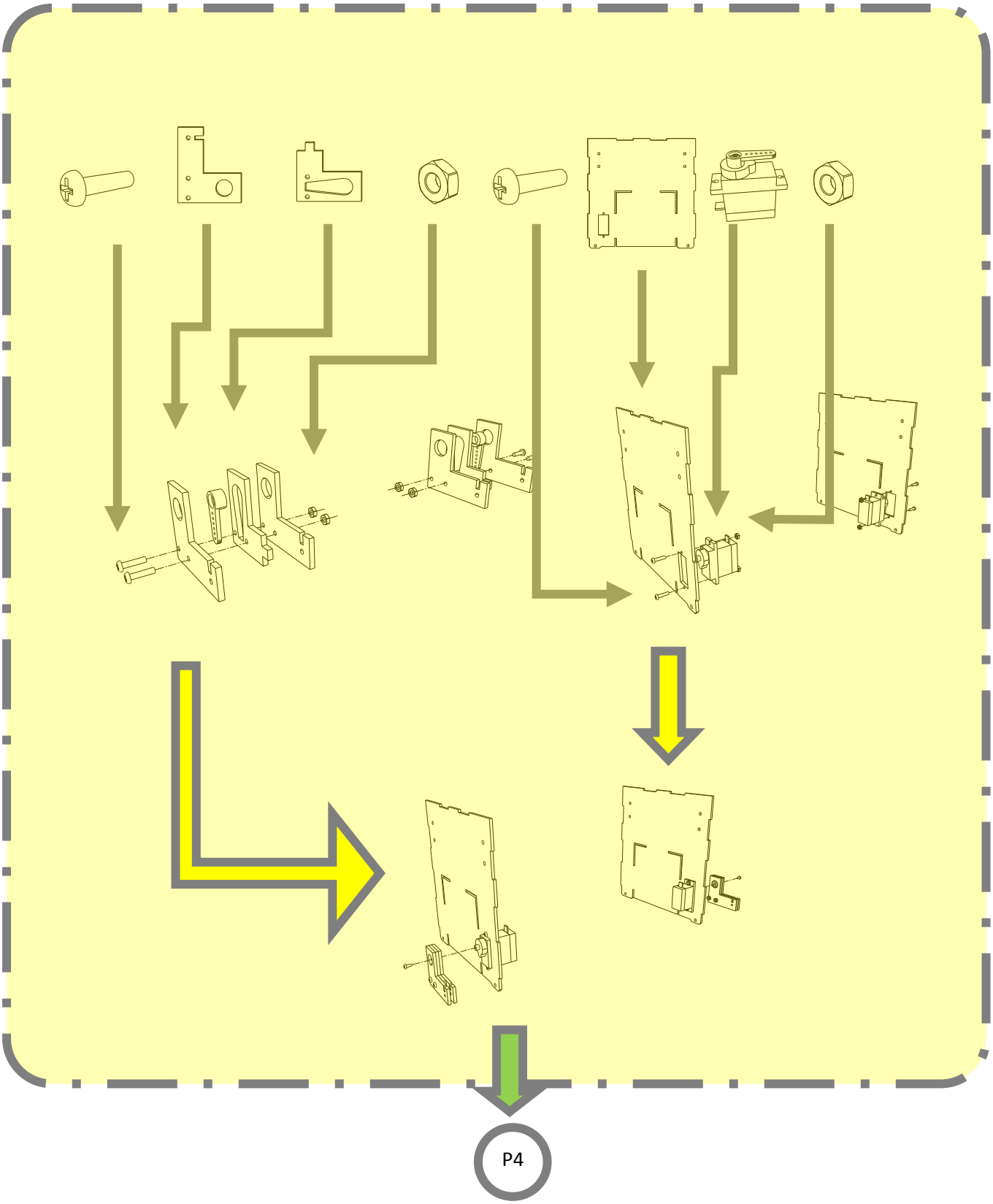
BOXZ Pro Standard Suit Assembly Sequence Part 1/4



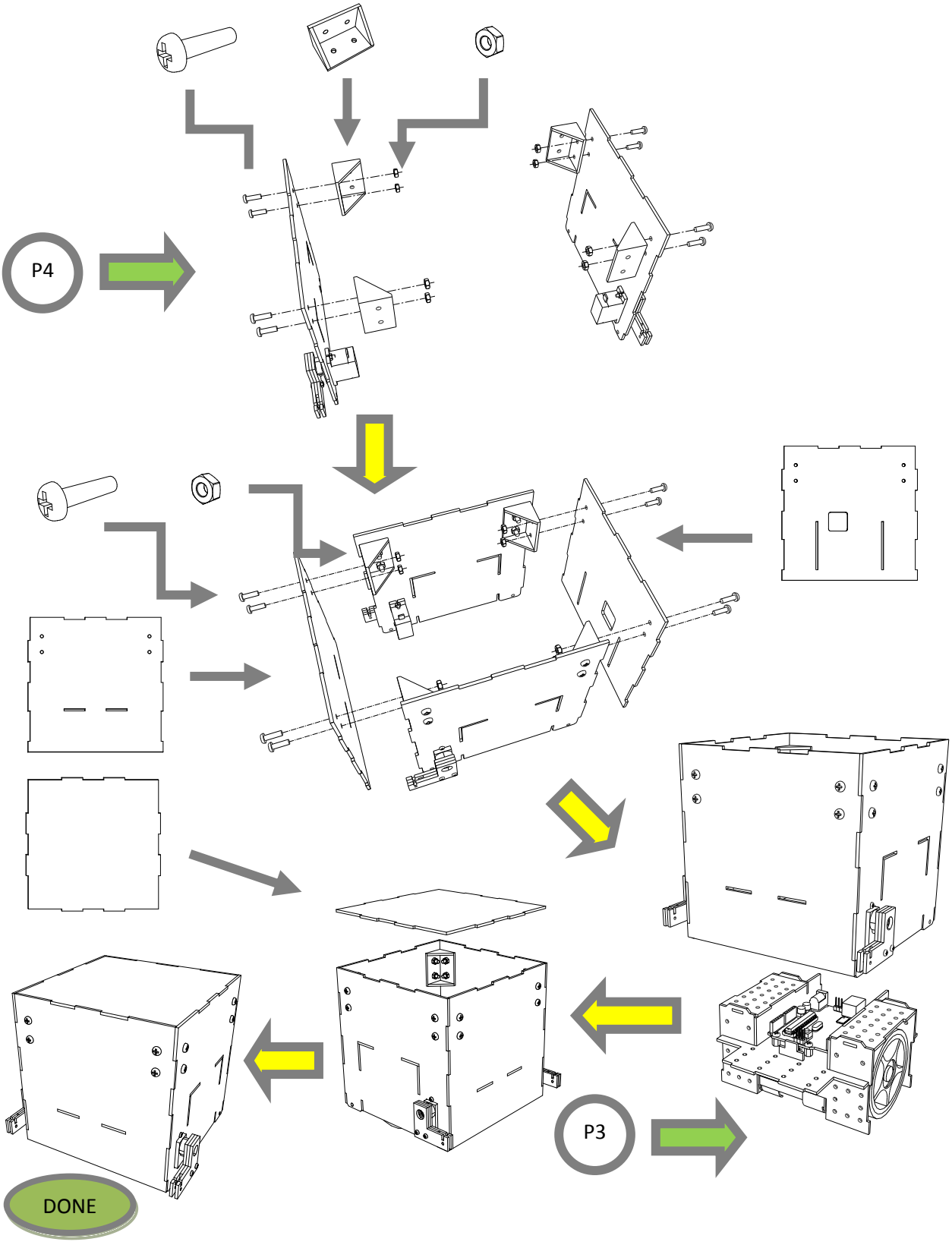
BOXZ Pro Standard Suit Assembly Sequence Part 2/4



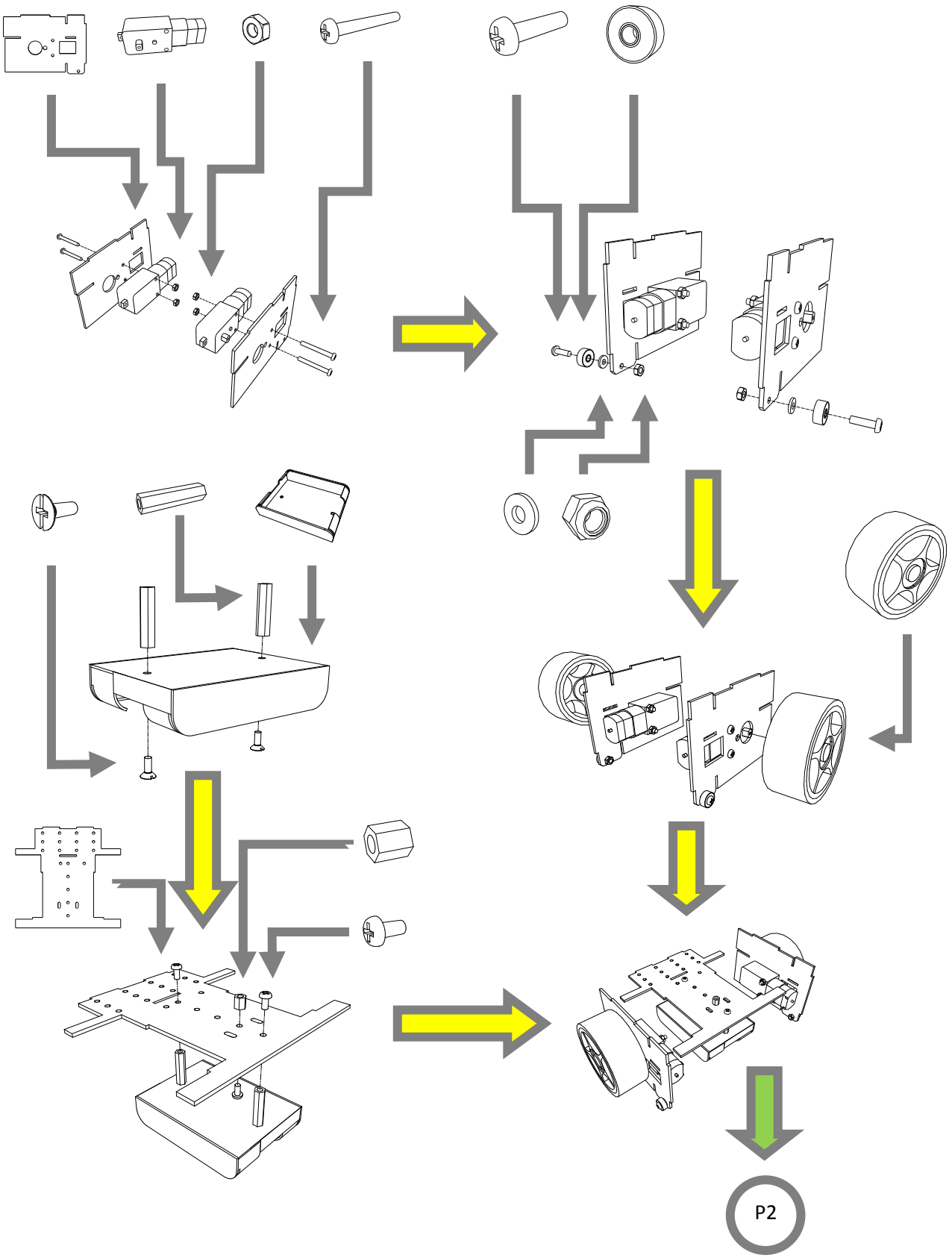
BOXZ Pro Standard Suit Assembly Sequence Part 3/4 (Include Football Extended Package Parts)



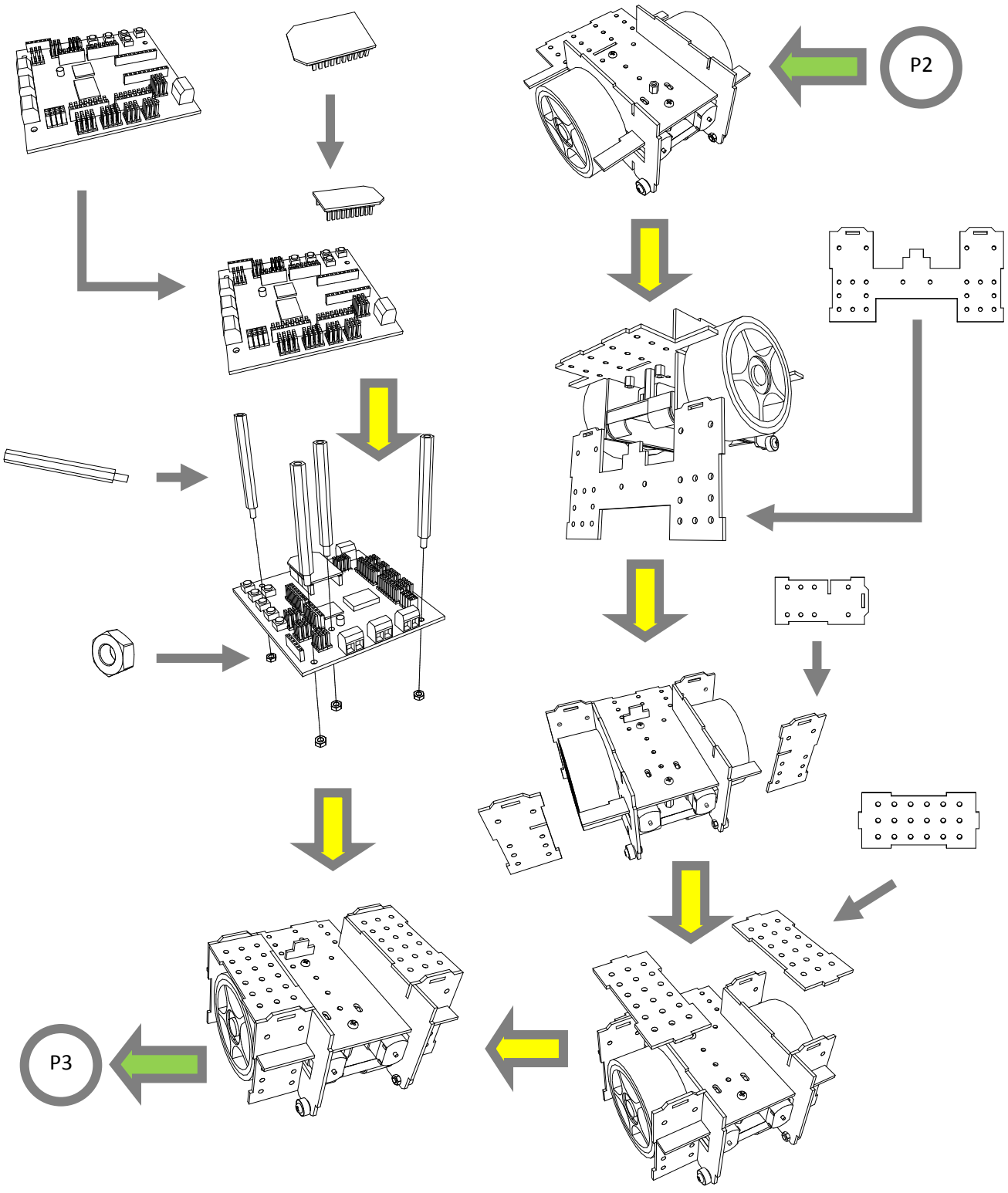
BOXZ Pro Standard Suit Assembly Sequence Part 4/4



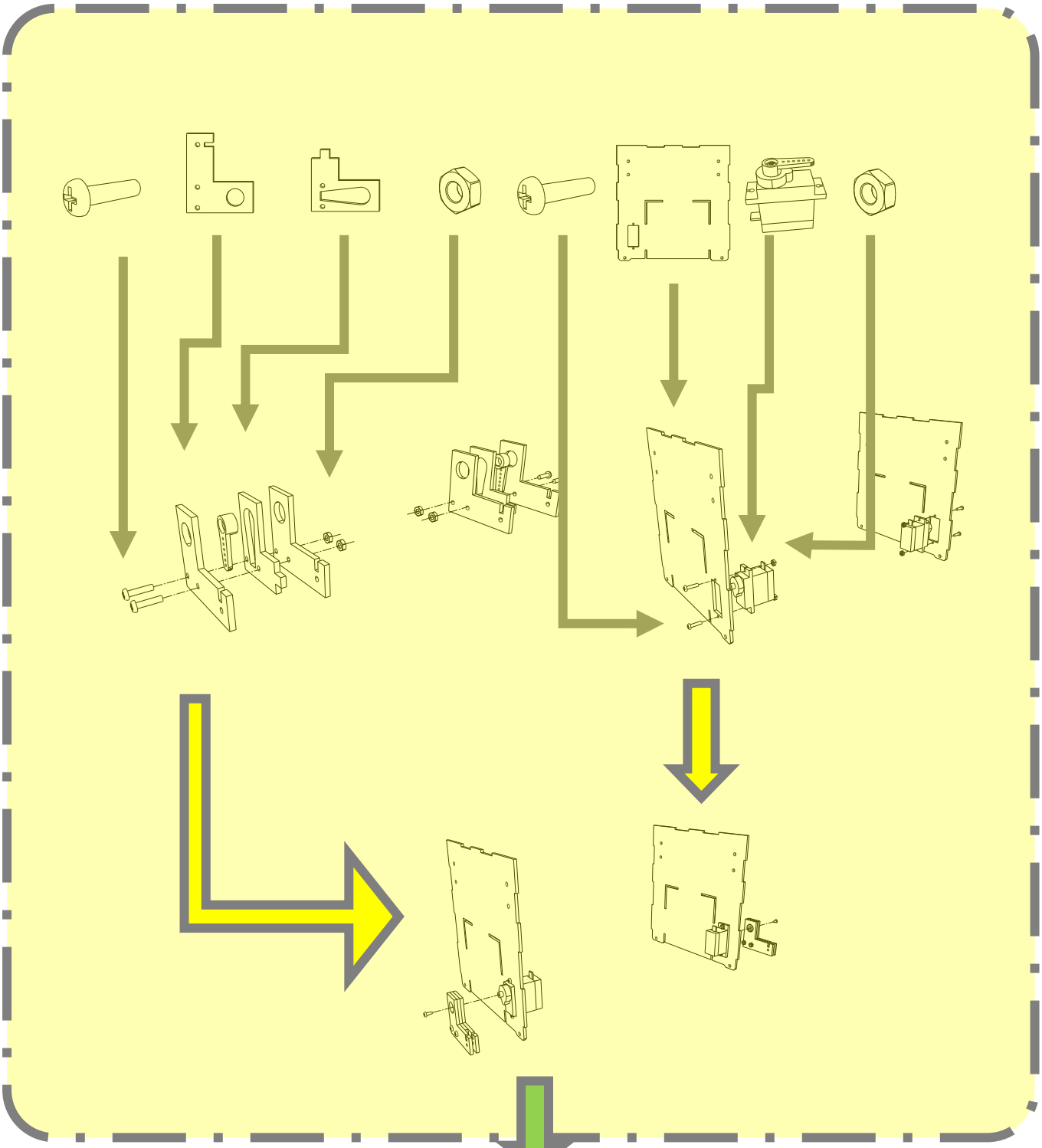
BOXZ Pro Standard Suit (DFROBOT ROMEO inside) Assembly Sequence Part 1/4



BOXZ Pro Standard Suit (DFROBOT ROMEO inside) Assembly Sequence Part 2/4

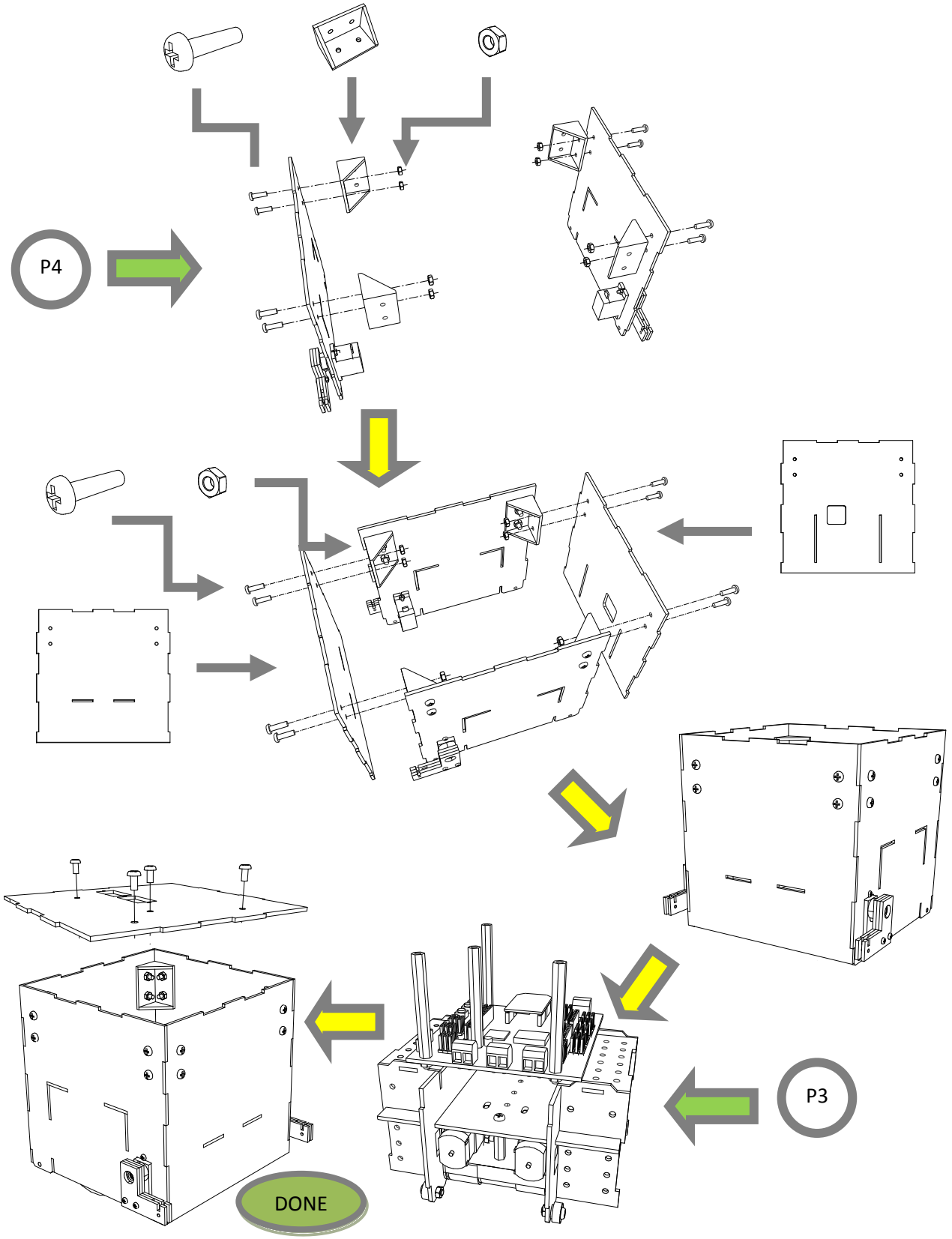


BOXZ Pro Standard Suit (DFROBOT ROMEO inside) Assembly Sequence Part 3/4



P4

BOXZ Pro Standard Suit (DFROBOT ROMEO inside) Assembly Sequence Part 4/4



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