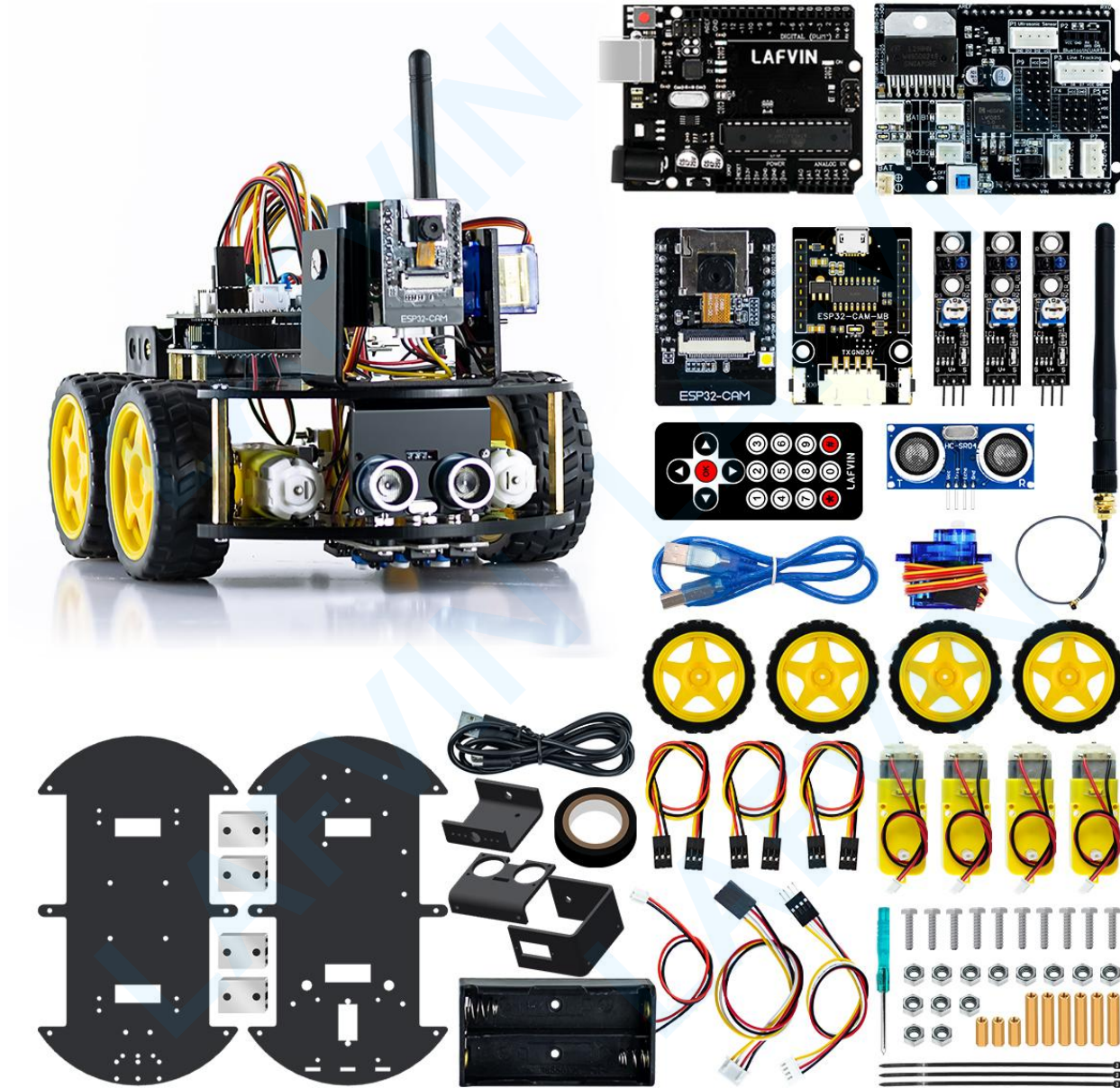


LAFVIN

LAFVIN

WiFi Camera Smart Robot Car

LAFVIN



LAFVIN

Package Content

No 18650 battery due to shipping restrictions

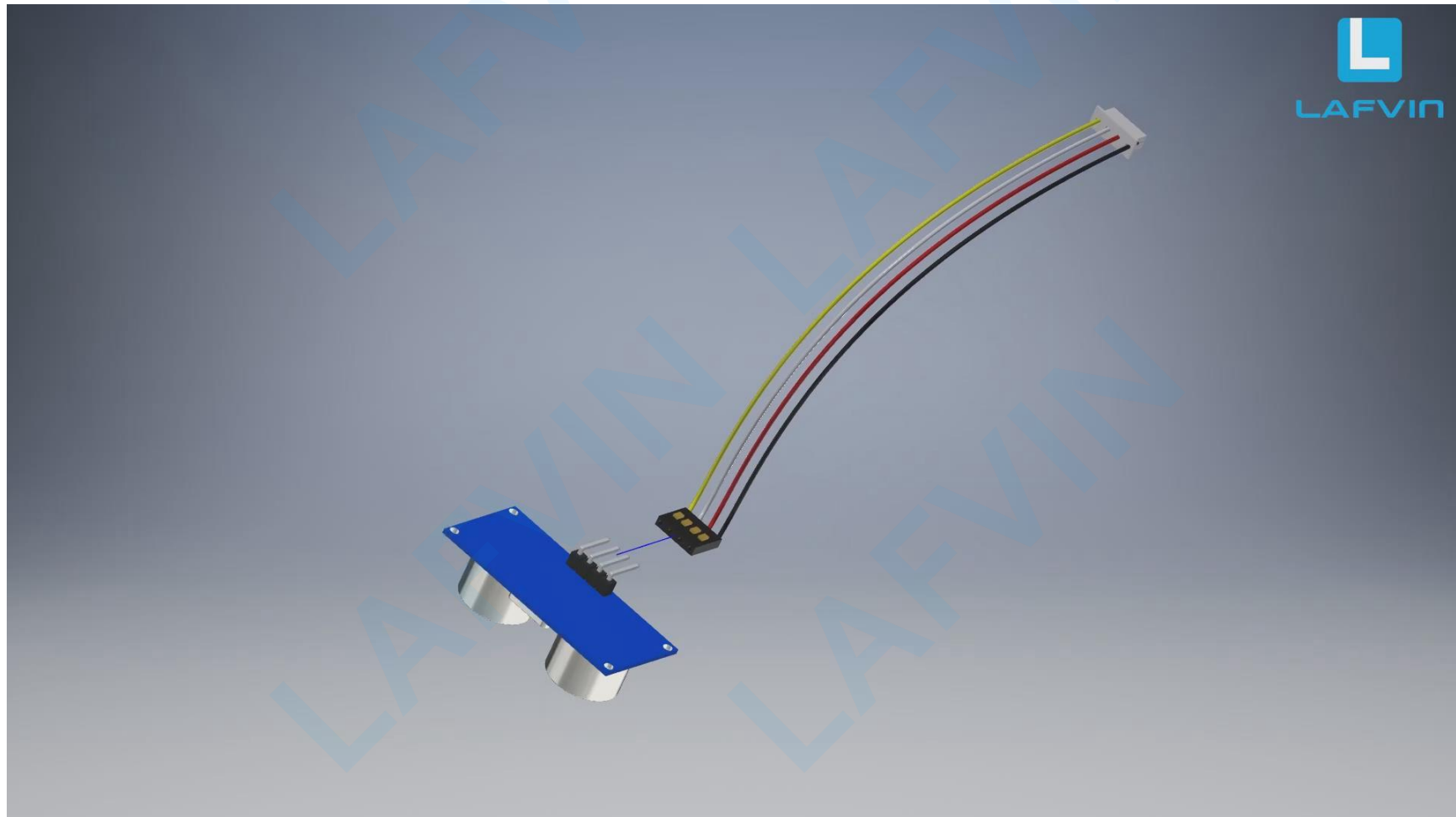


Content

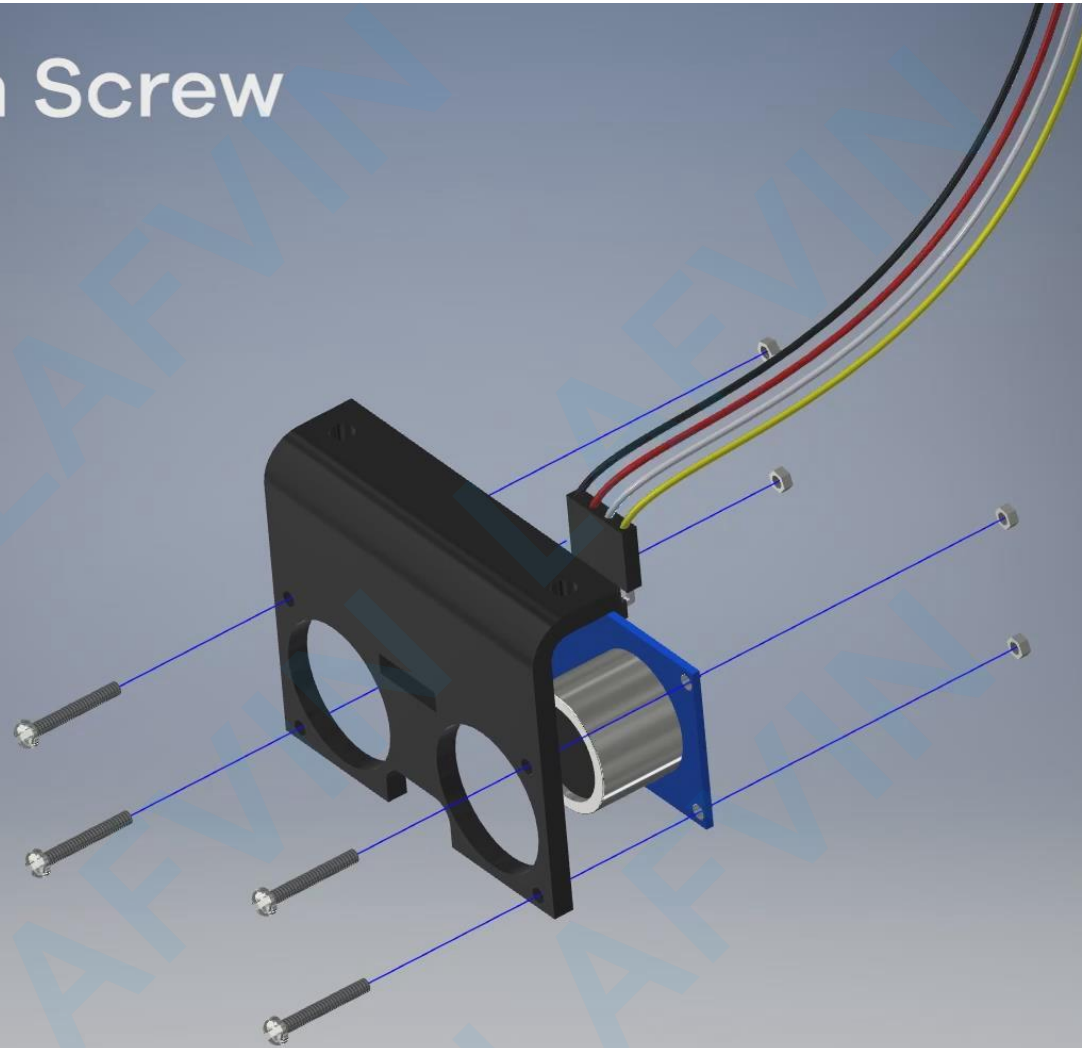
| | | |
|---|--|----|
| ◆ | Step 1:Assembly Tutorial | 1 |
| ◆ | Step 2:Install Arduino IDE | 34 |
| ◆ | Step 3:Install Arduino UNO Driver | 35 |
| ◆ | Step 4:Upload Arduino UNO Main Code | 42 |
| ◆ | Step 5:Infrared Remote Control Robot Car | 48 |
| ◆ | Step 6:APP Control Smart Robot Car | 55 |

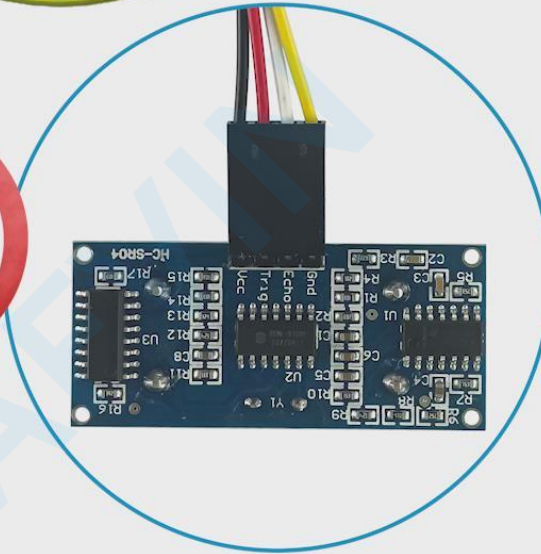
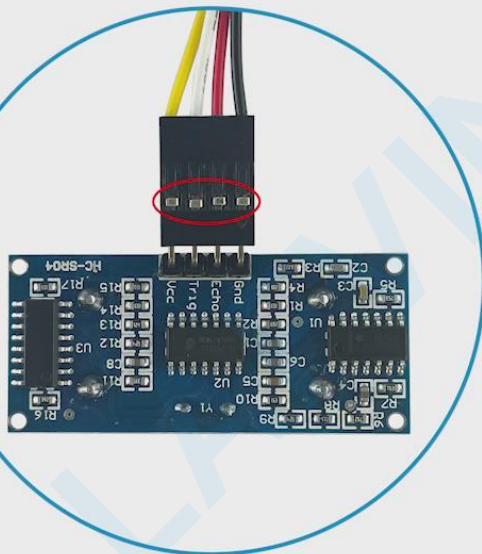
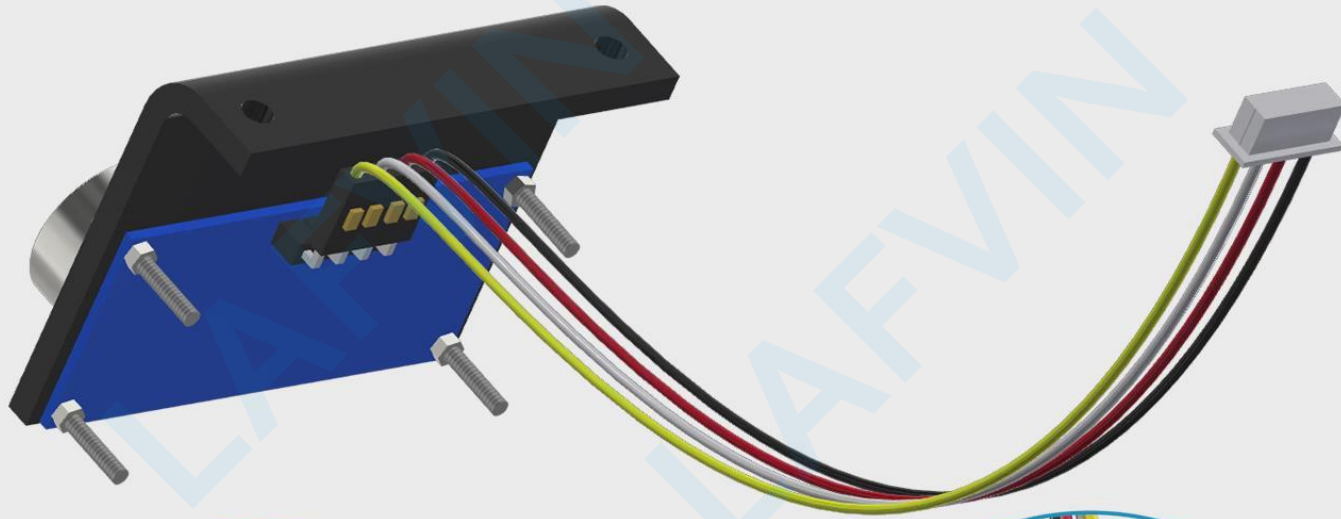
◆ Step 1: Assembly Tutorial

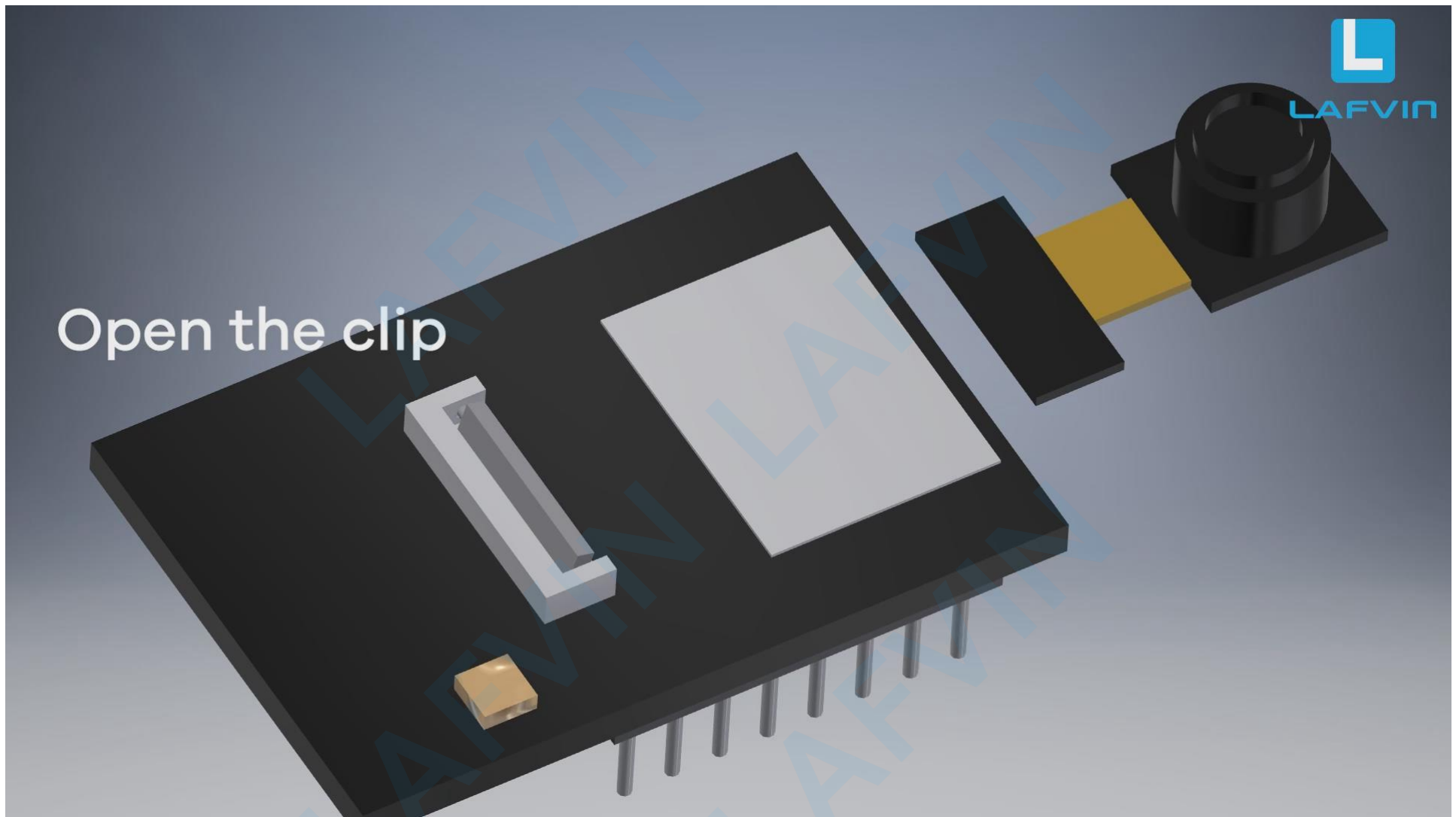
For more details refer to



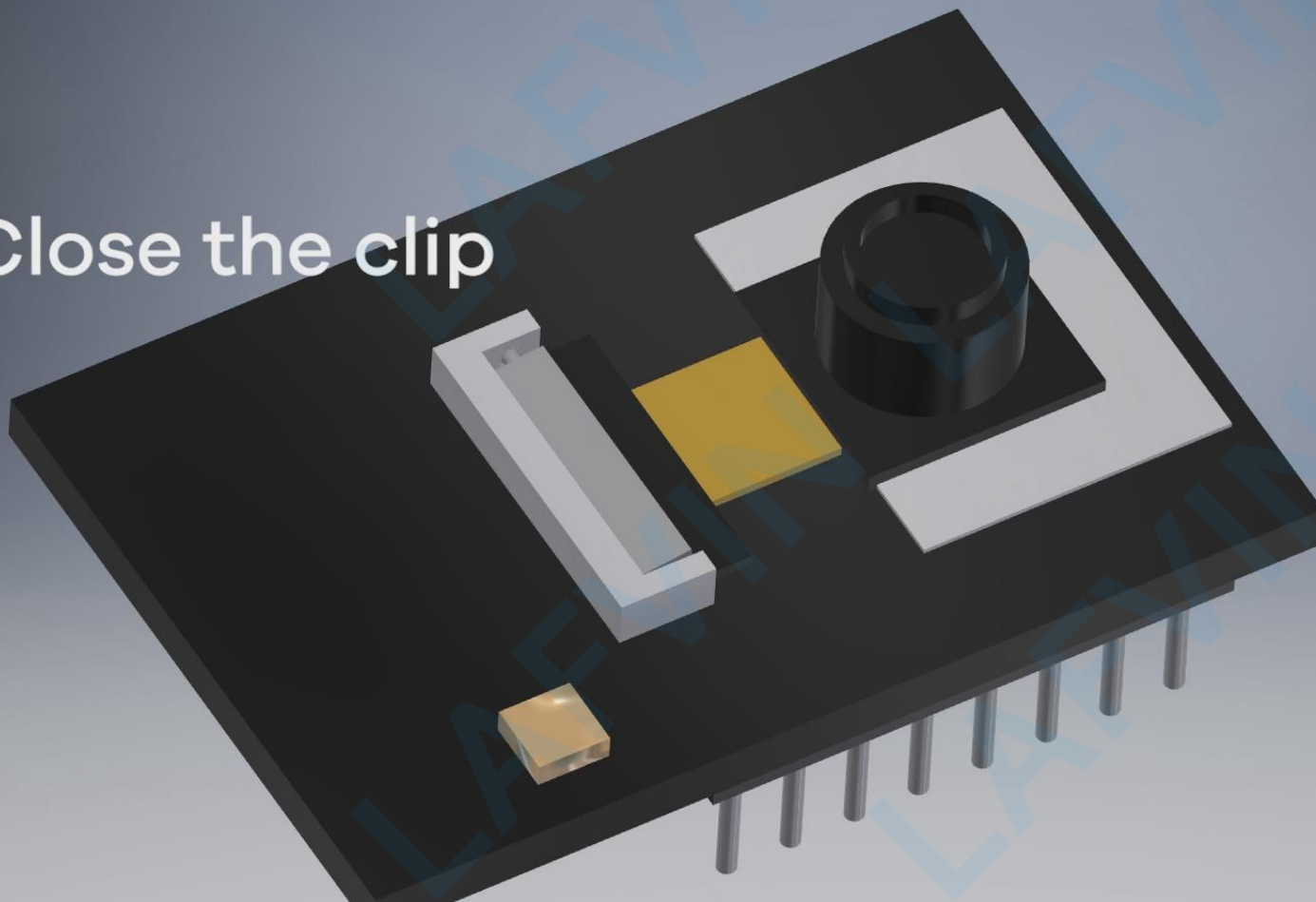
M1.6 * 12 mm Screw
M1.6 Nut





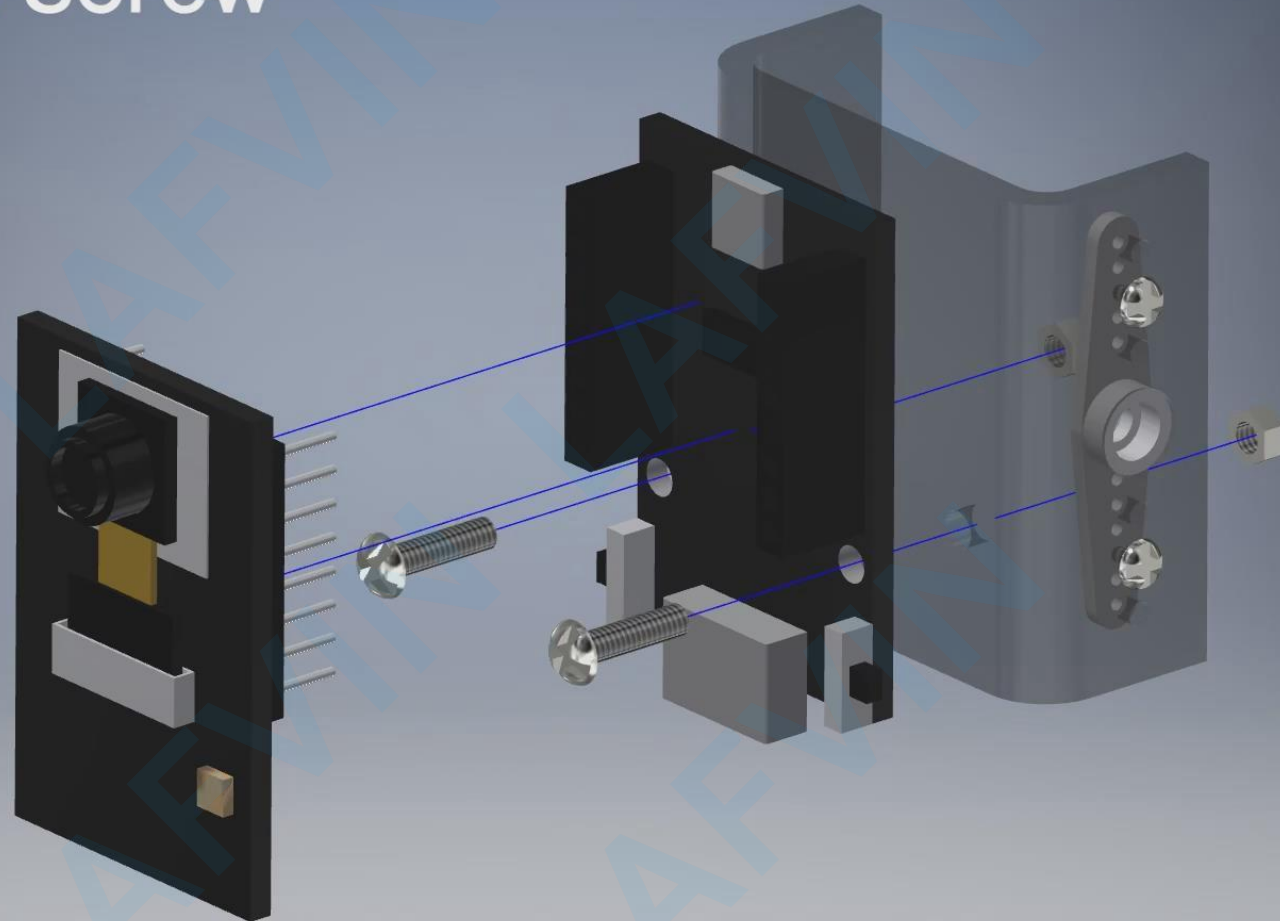


Close the clip

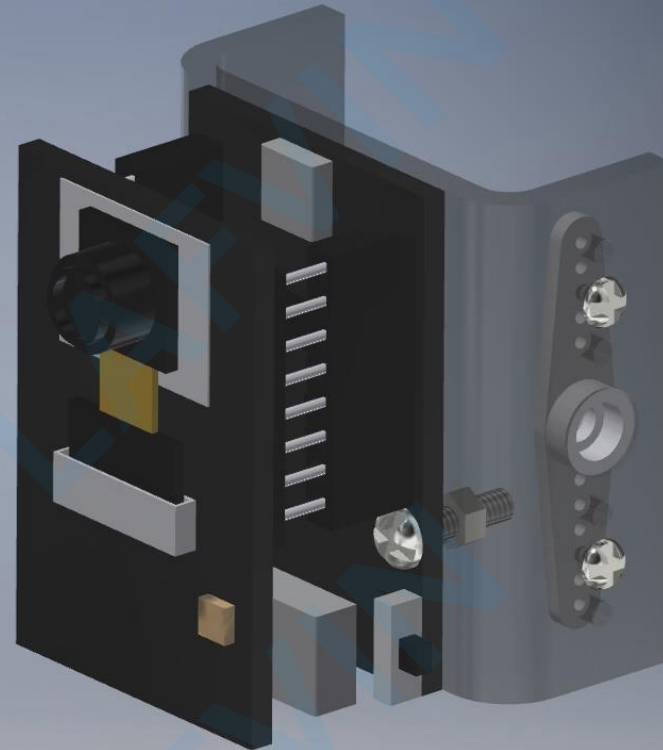




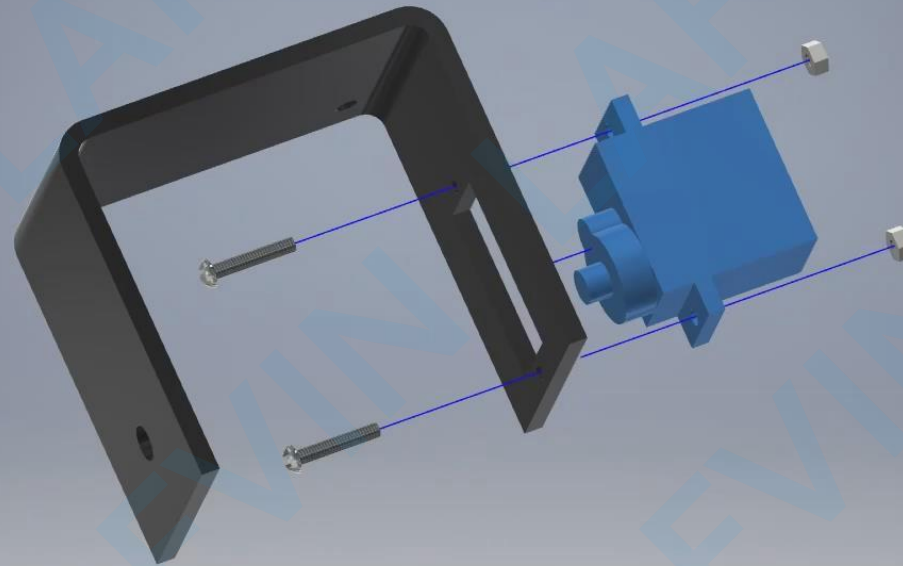
M3 * 12 mm Screw
M3 Nut

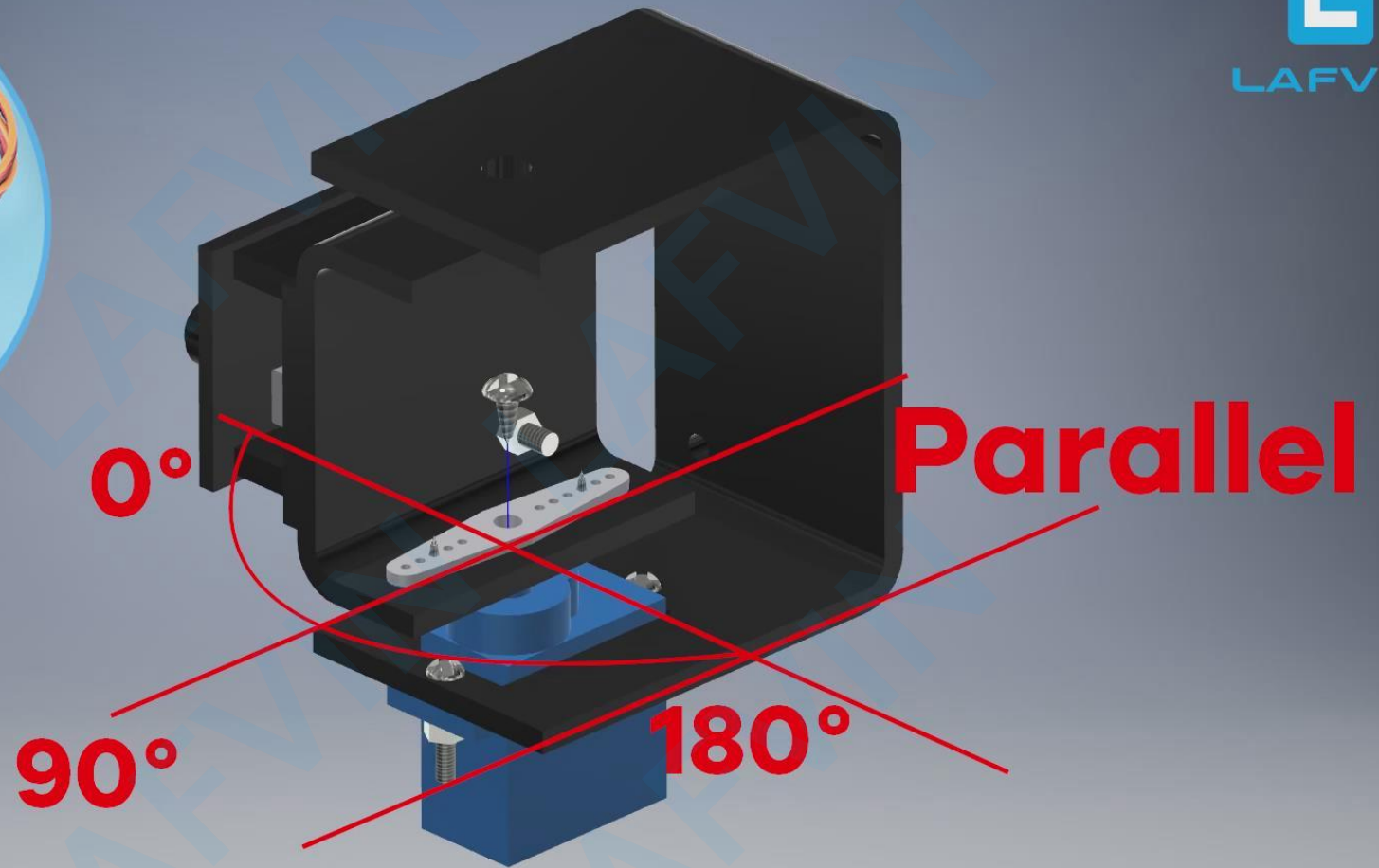


M3 * 12 mm Screw
M3 Nut



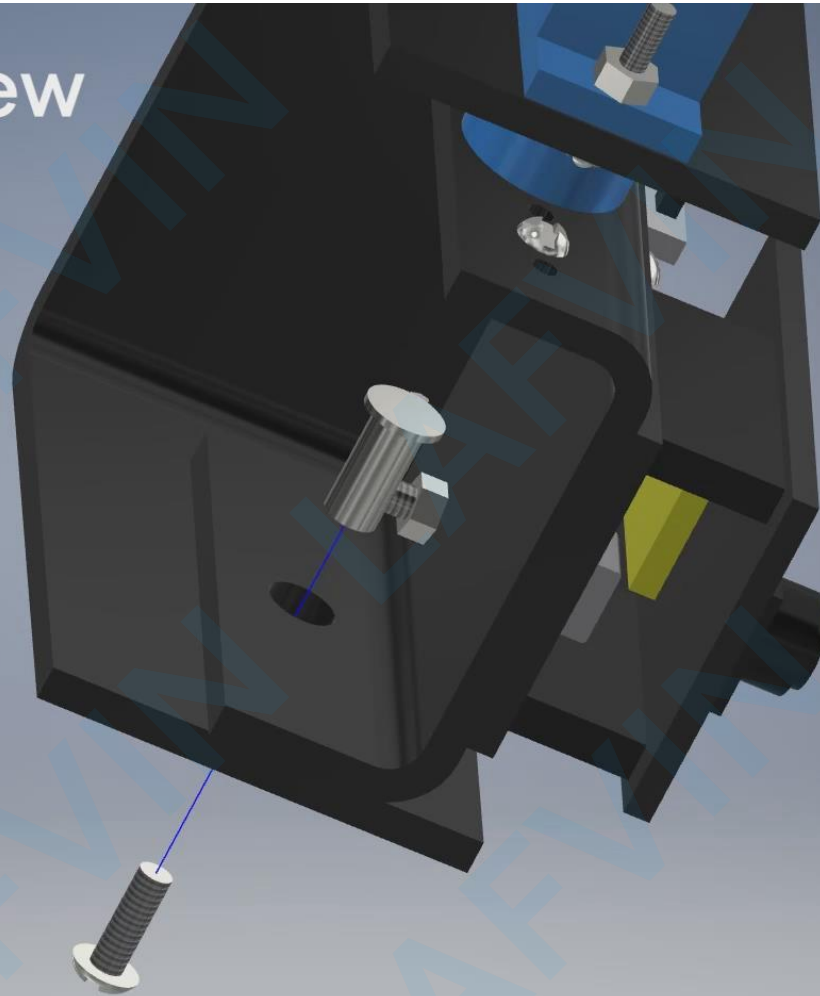
M2 * 12 mm Screw
M2 Nut



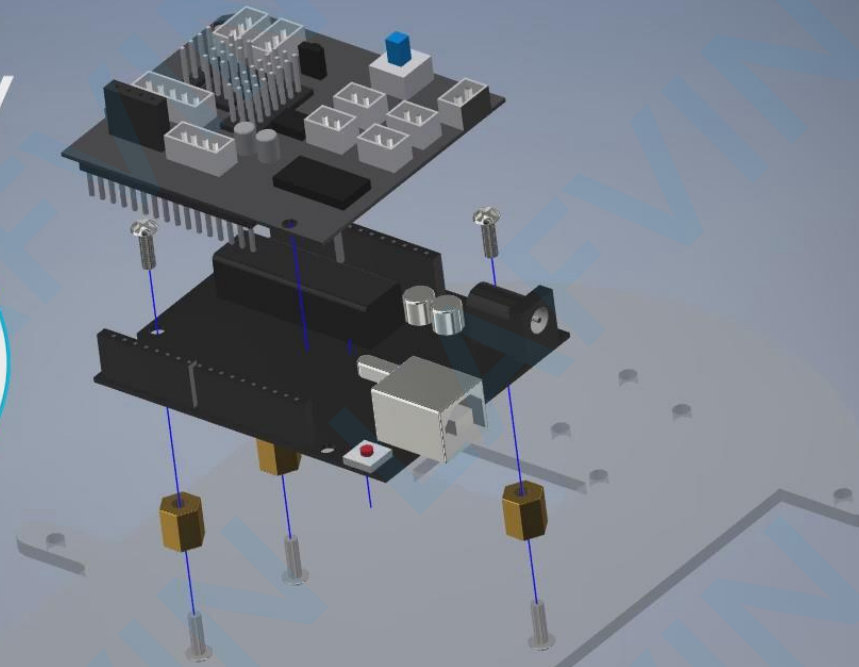
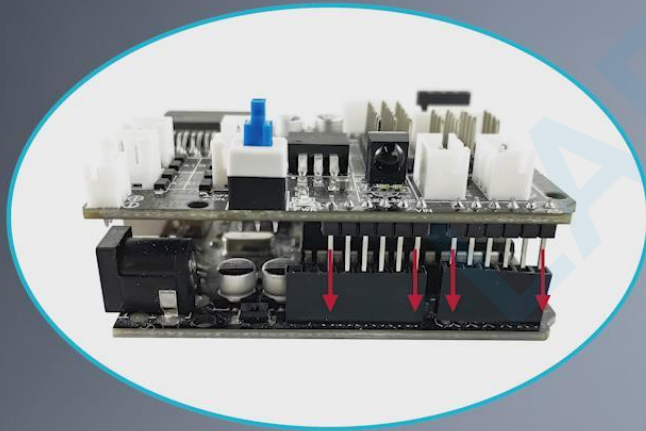


Get from Steering gear package

M5 * 8 Rivet Screw

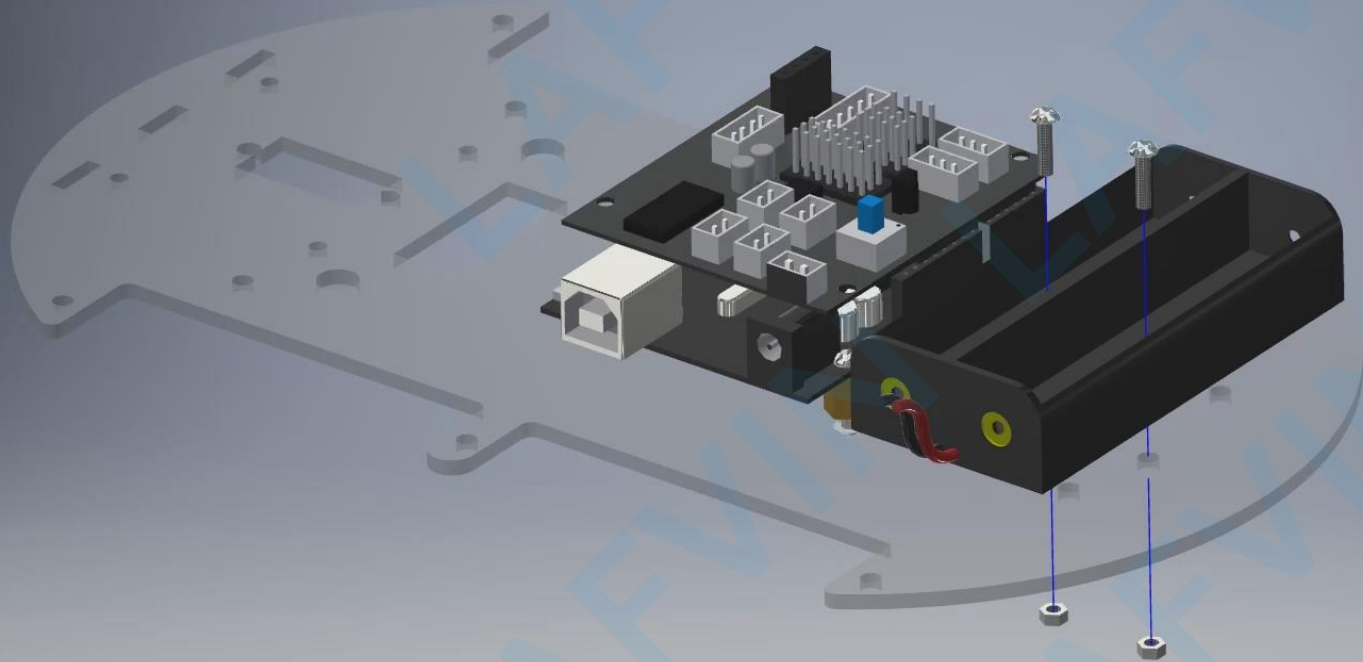


Install correctly



M3 * 6 mm Screw
M3 * 10mm Copper Cylinder

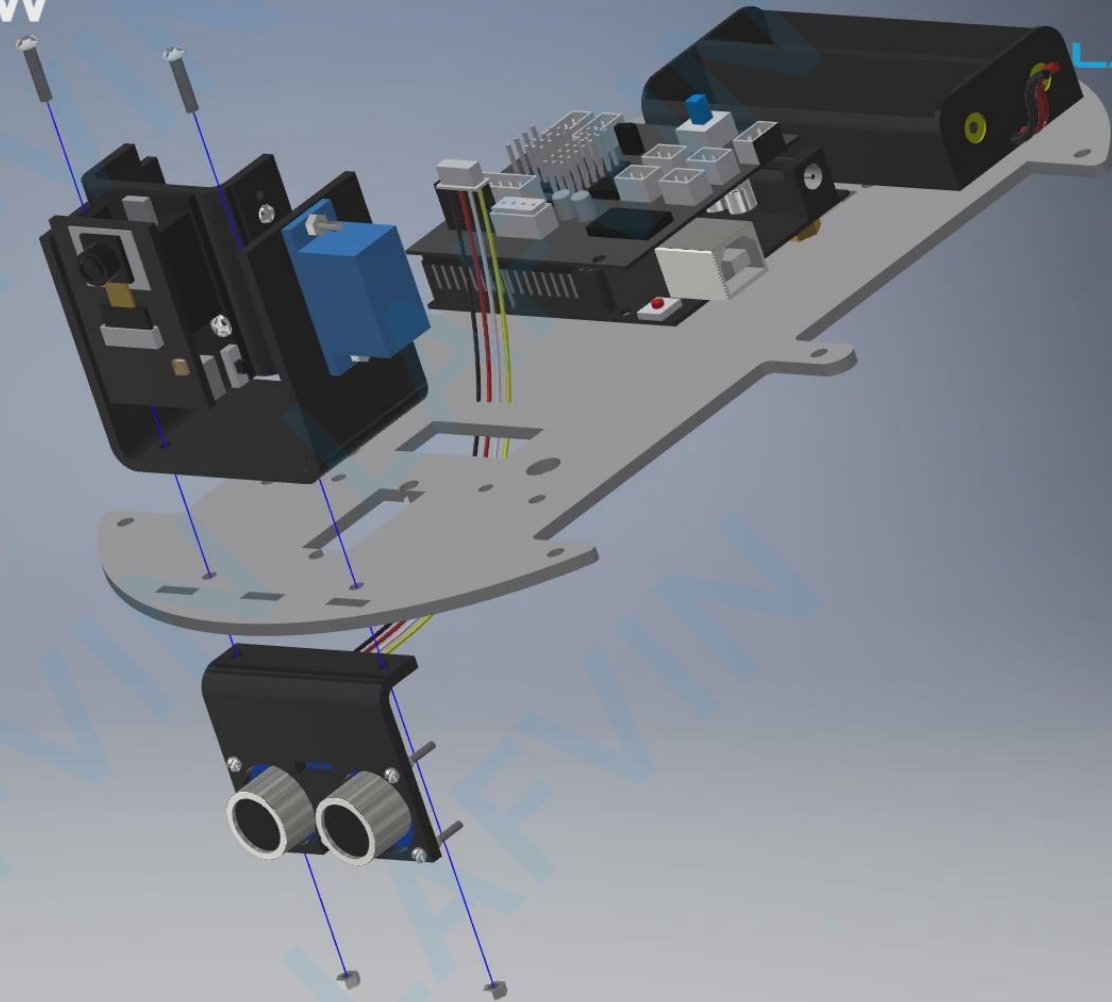
M3 * 8 mm Screw
M3 Nut



M3 * 12 mm Screw
M3 Nut



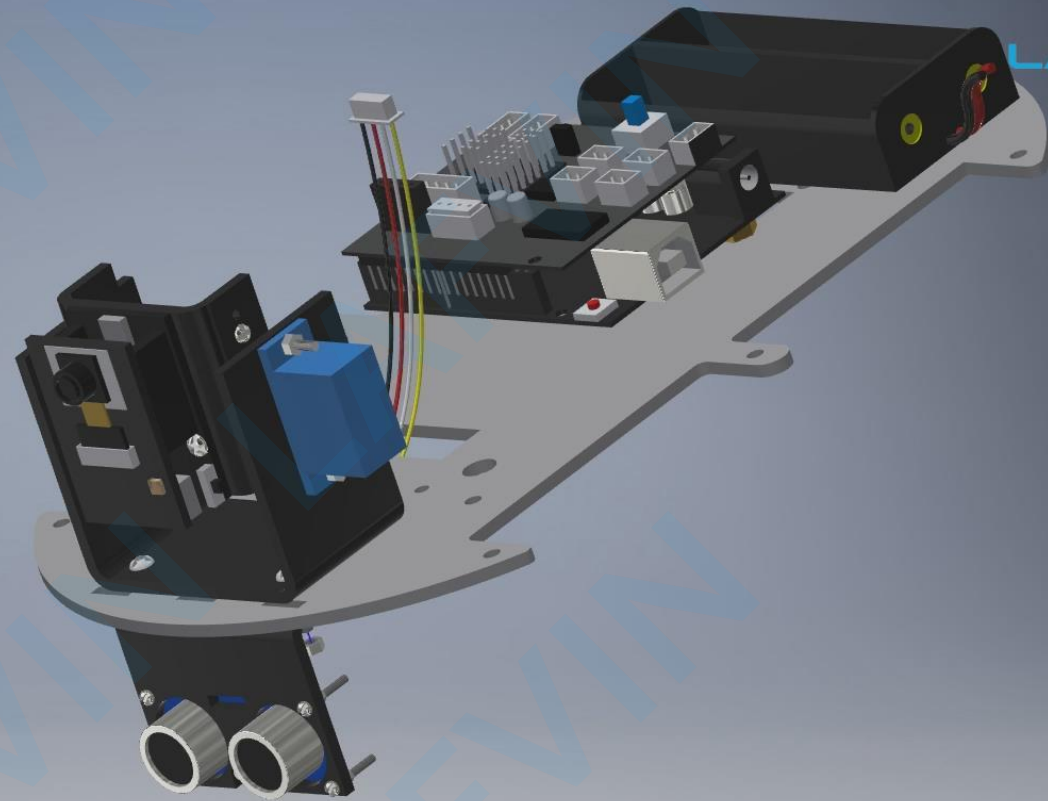
LAFVIN



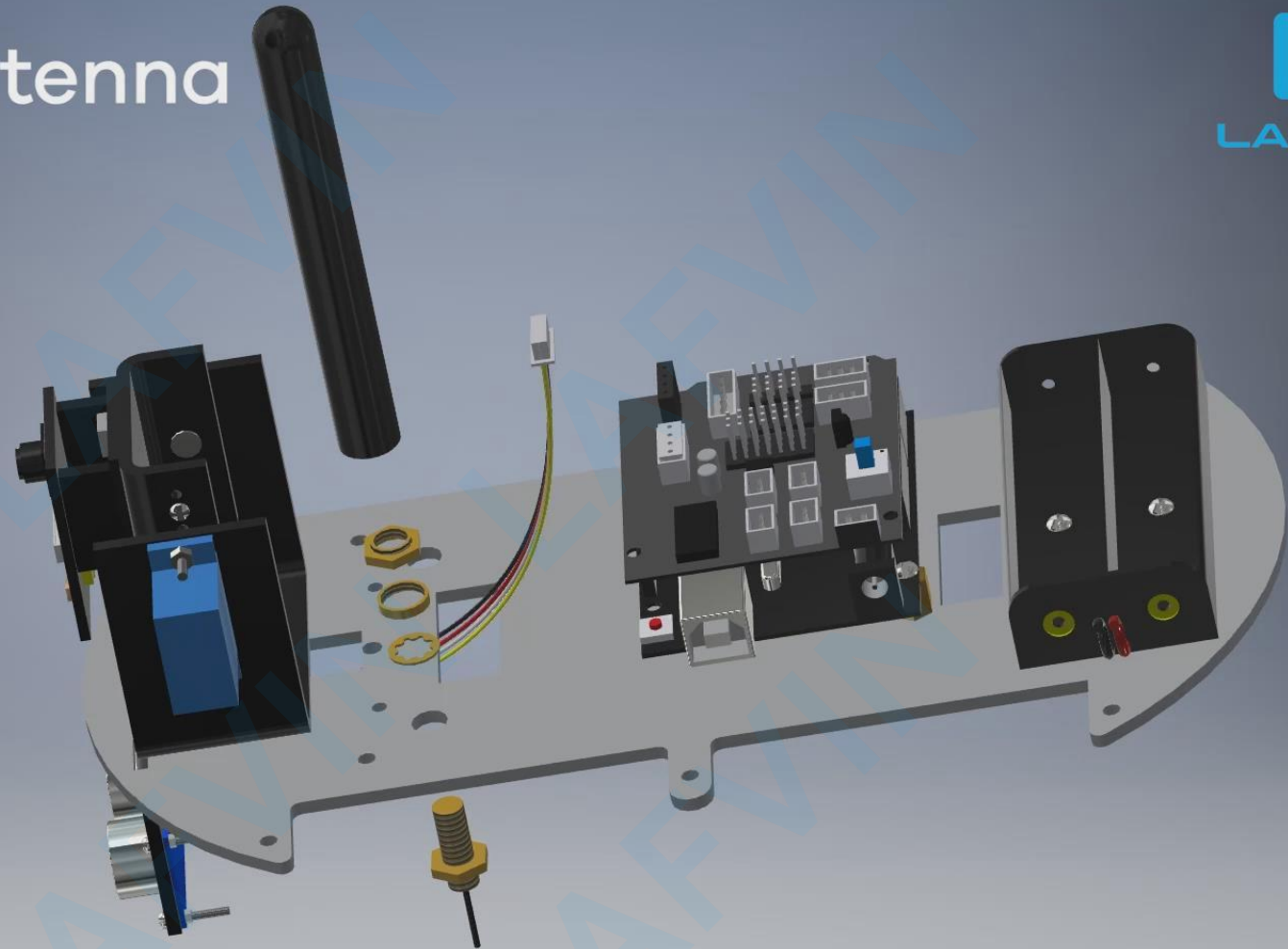
M3 * 12 mm Screw
M3 Nut

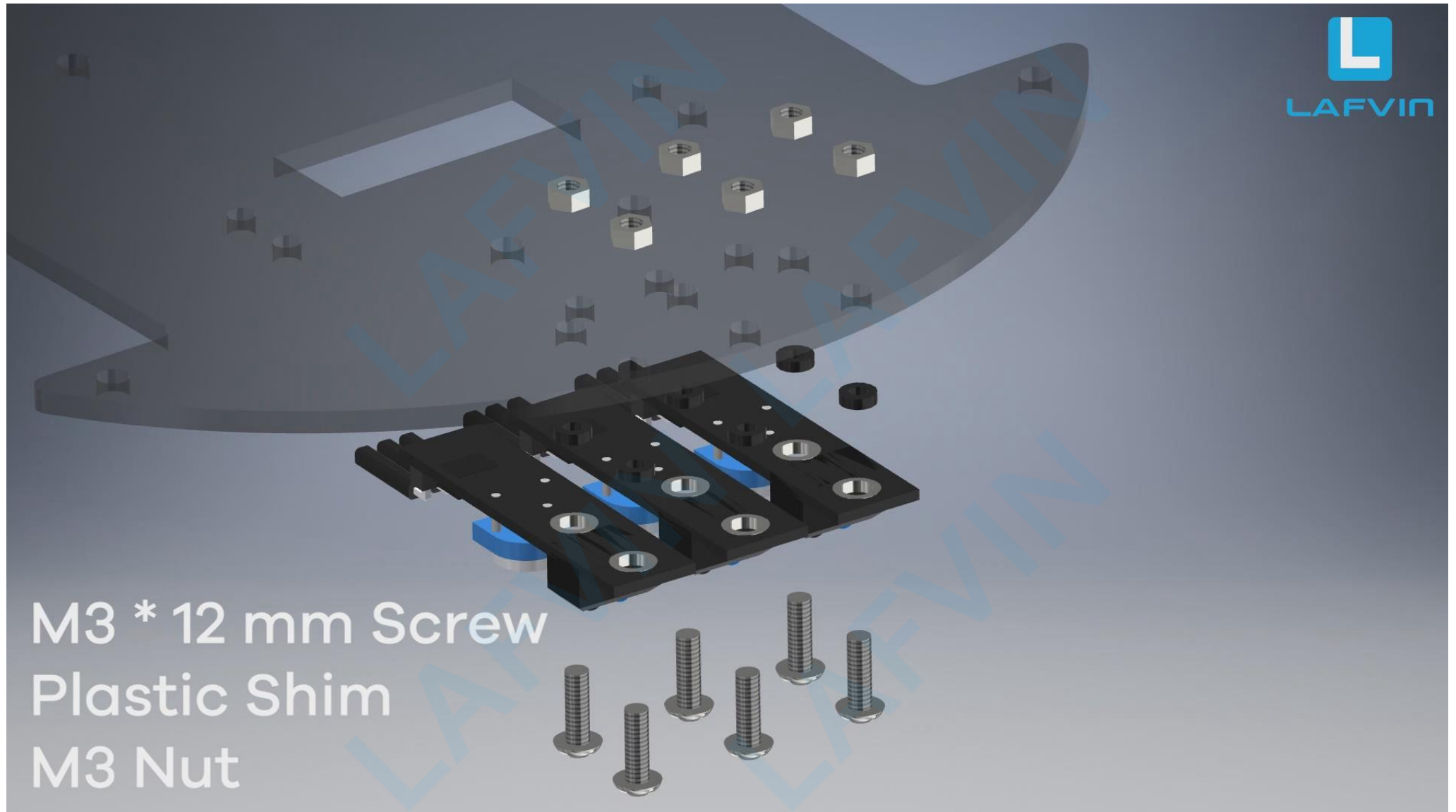


LAFVIN

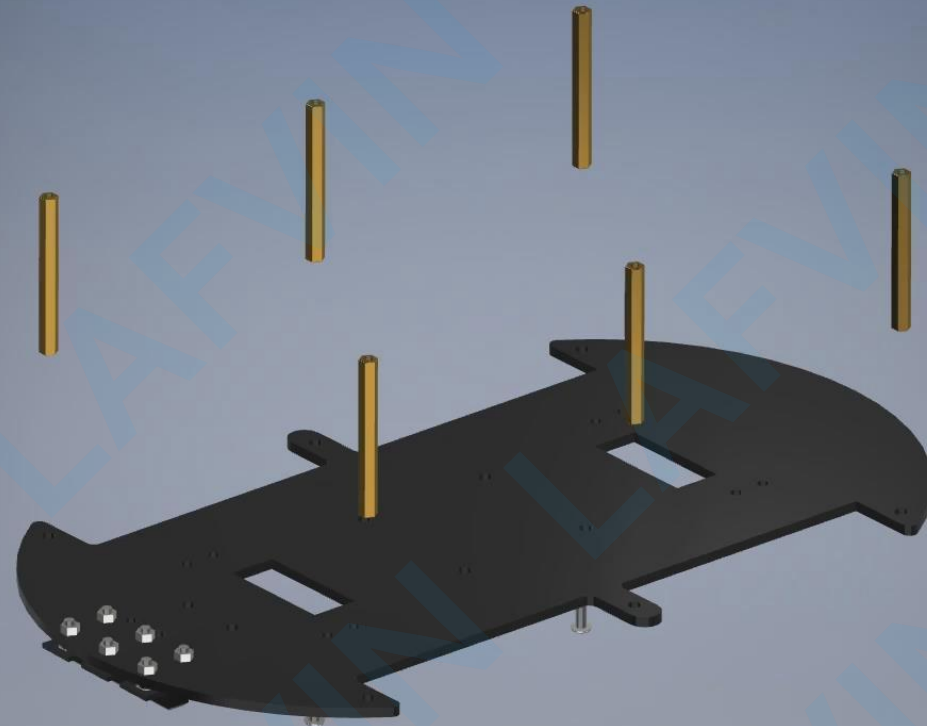


External Antenna



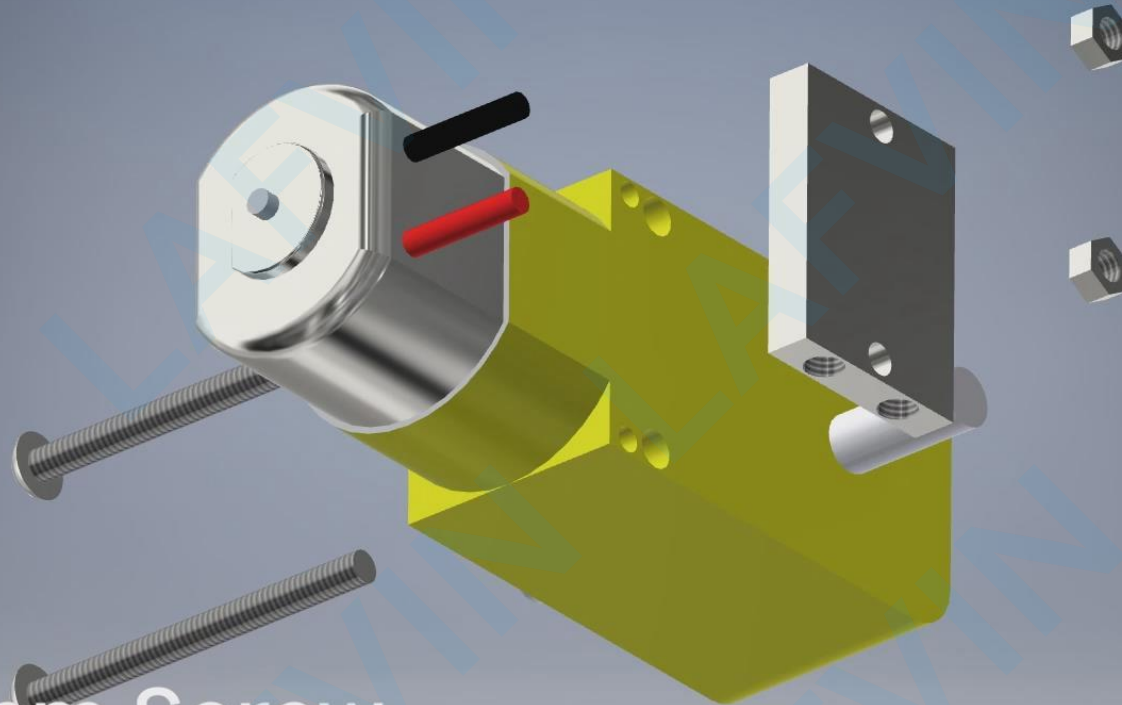


LAFVIN

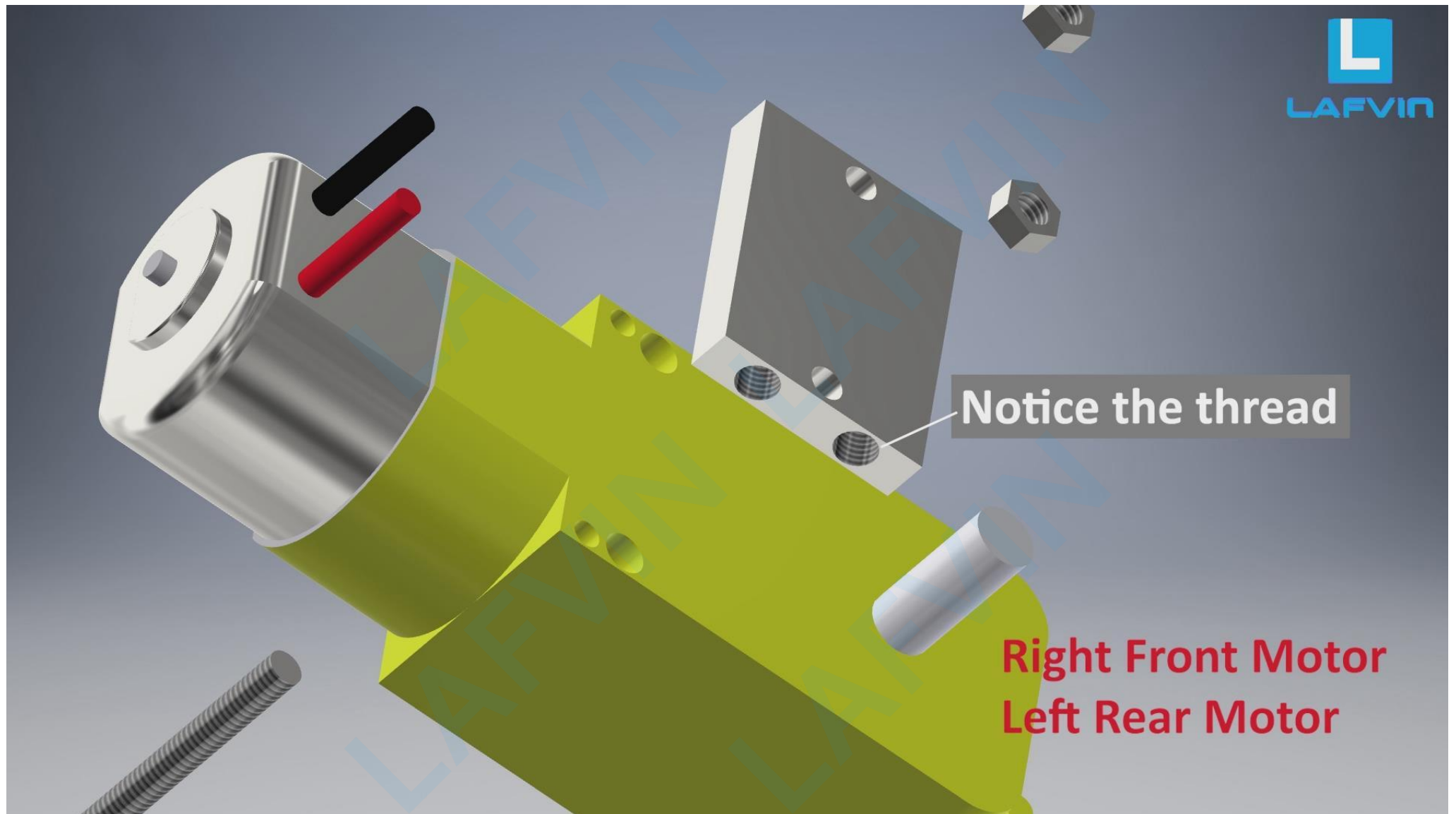


M3 * 10 mm Screw

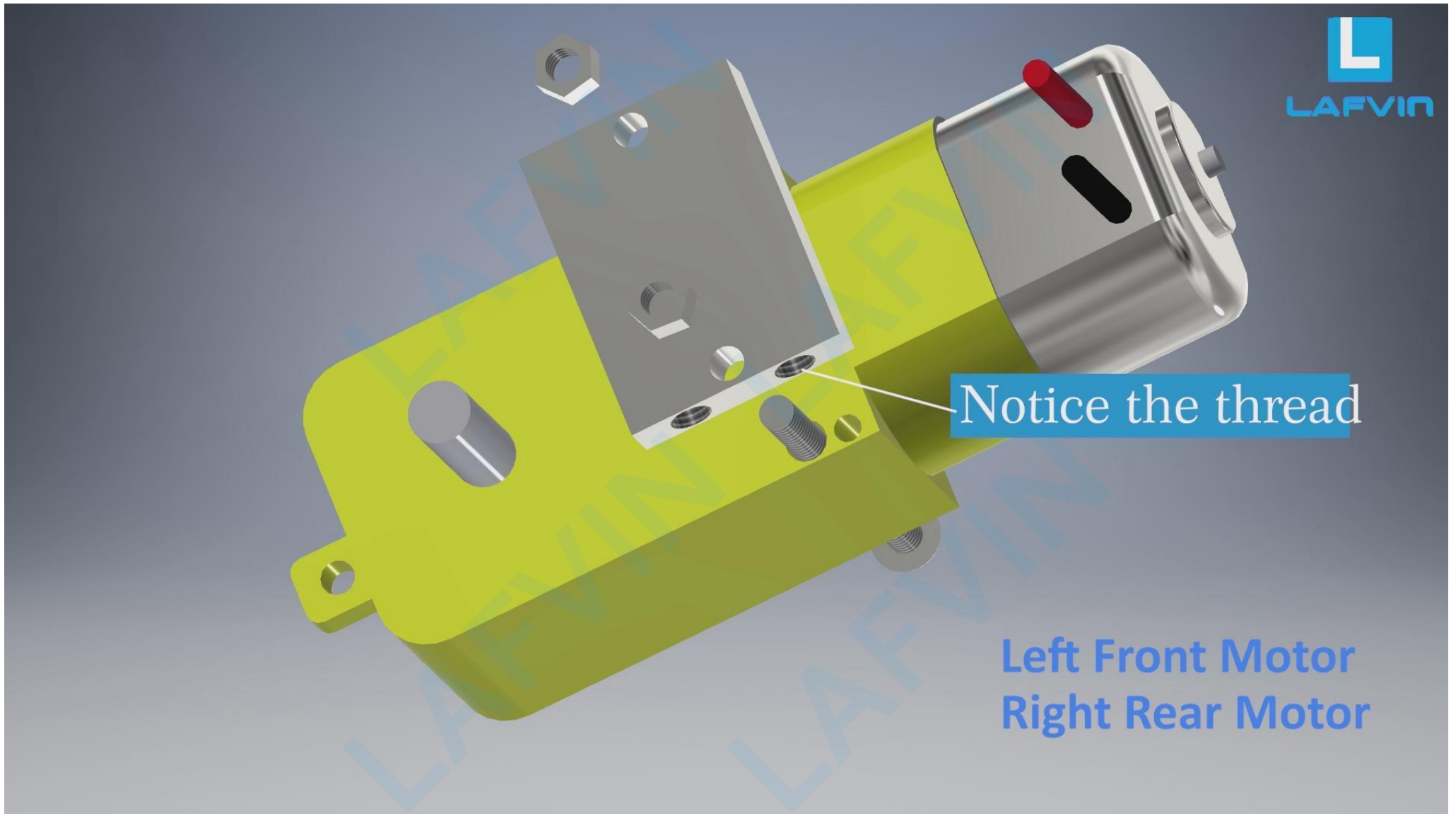
M3 * 40mm Copper Cylinder



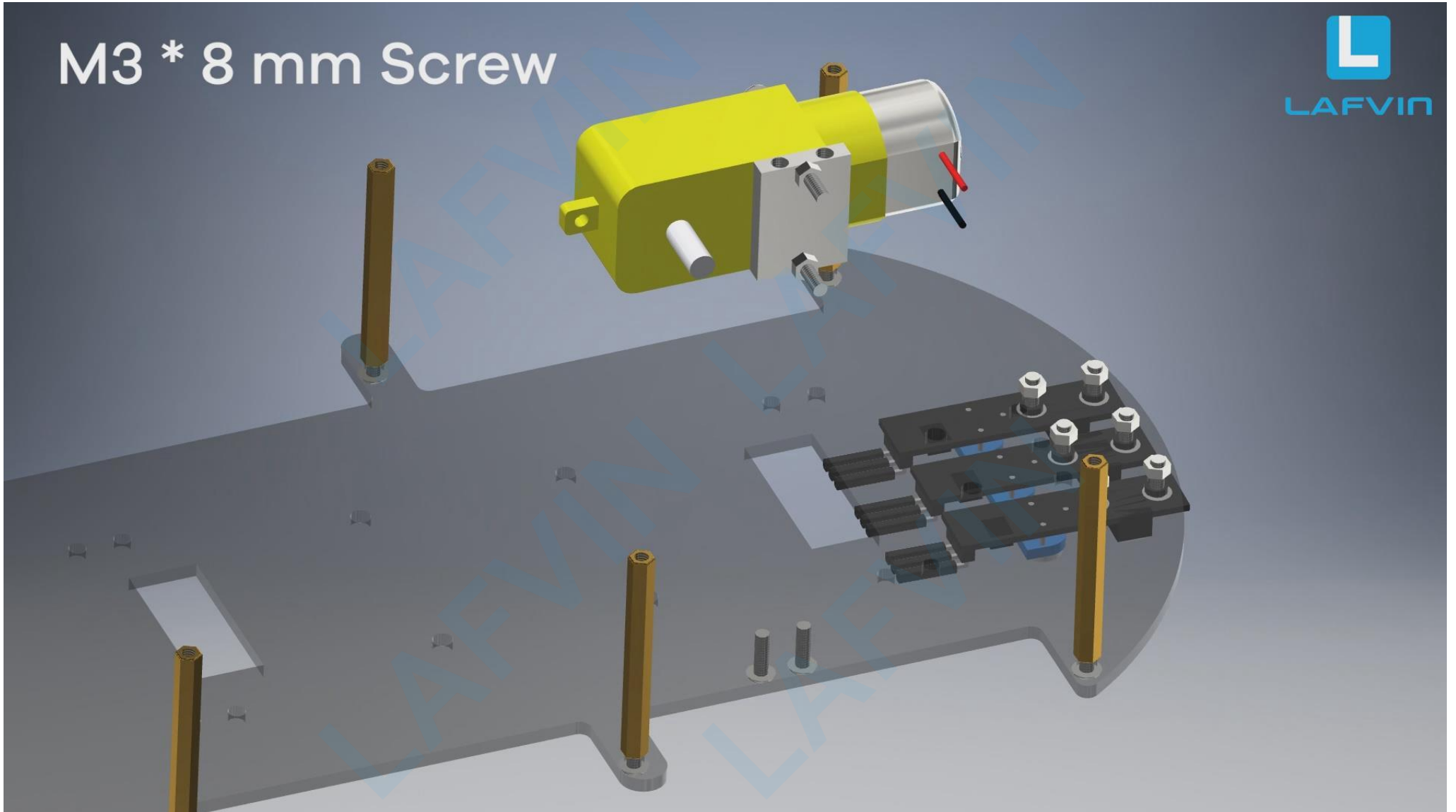
M3 * 30 mm Screw
Aluminum Block
M3 Nut

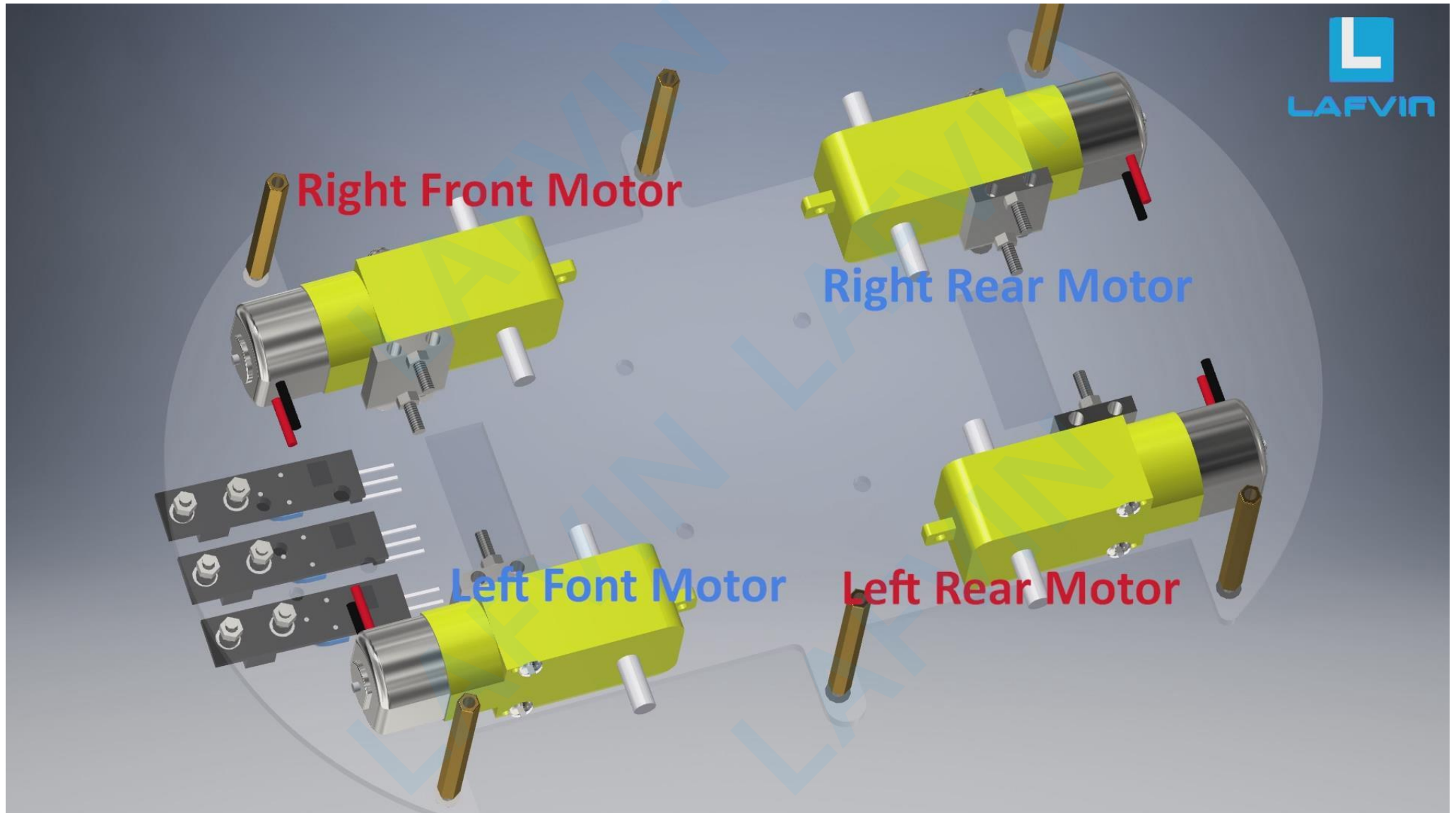


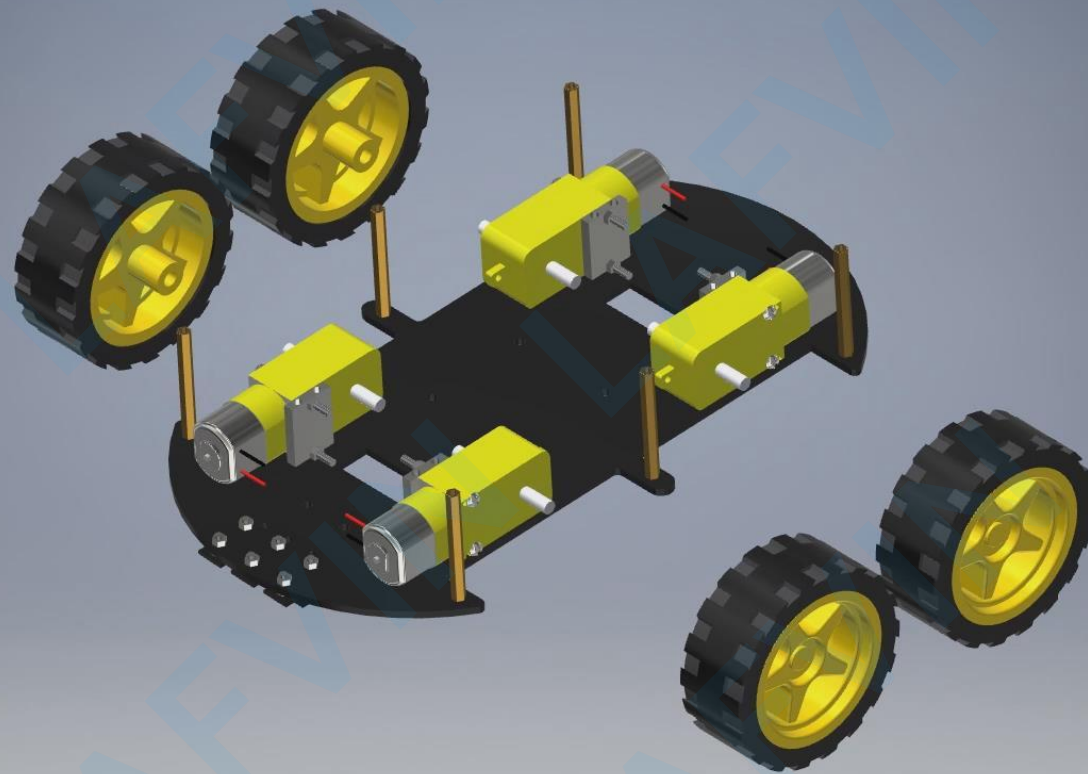
LAFVIN



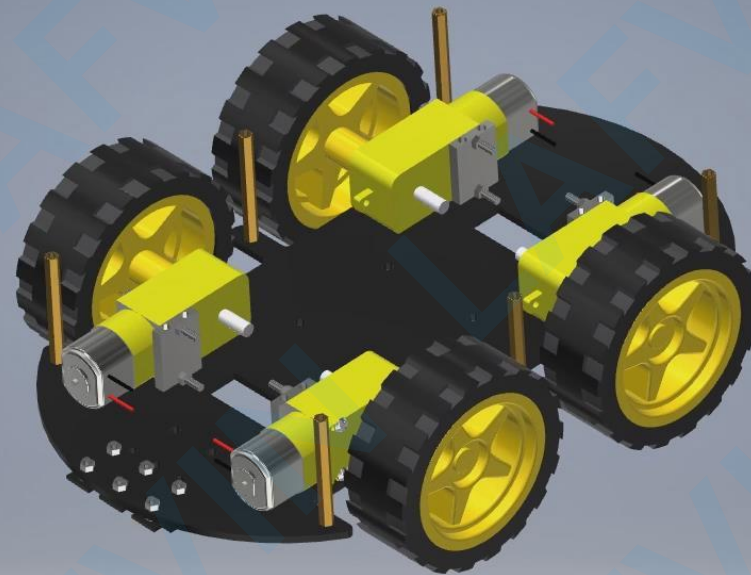
M3 * 8 mm Screw



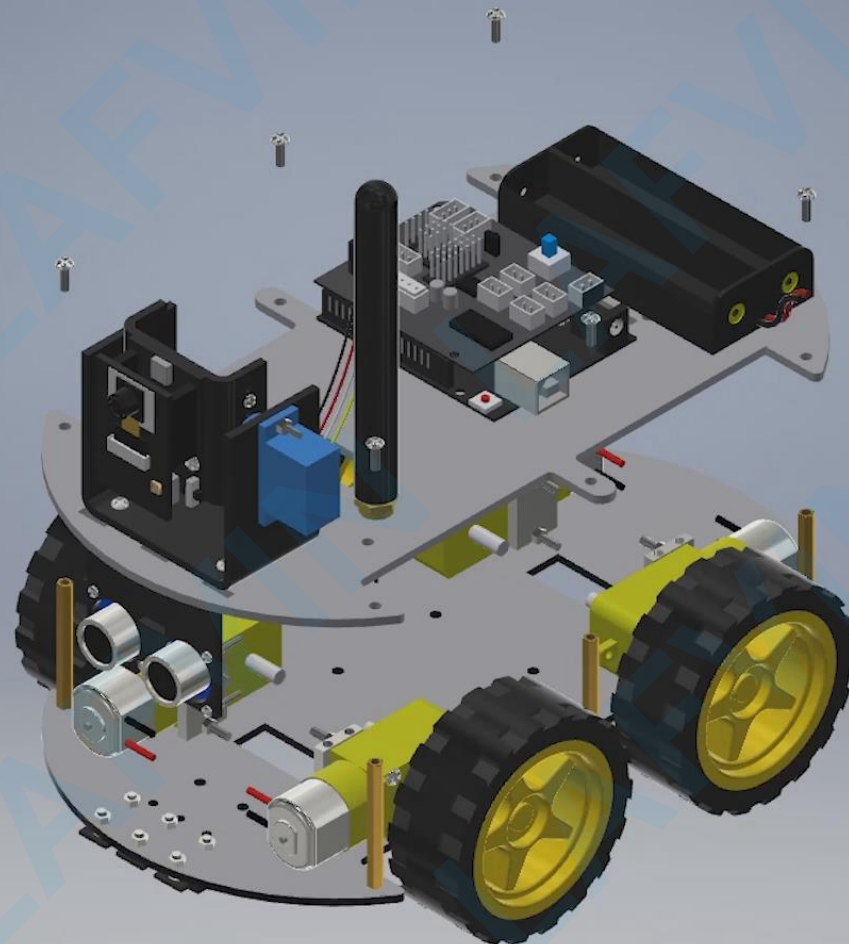




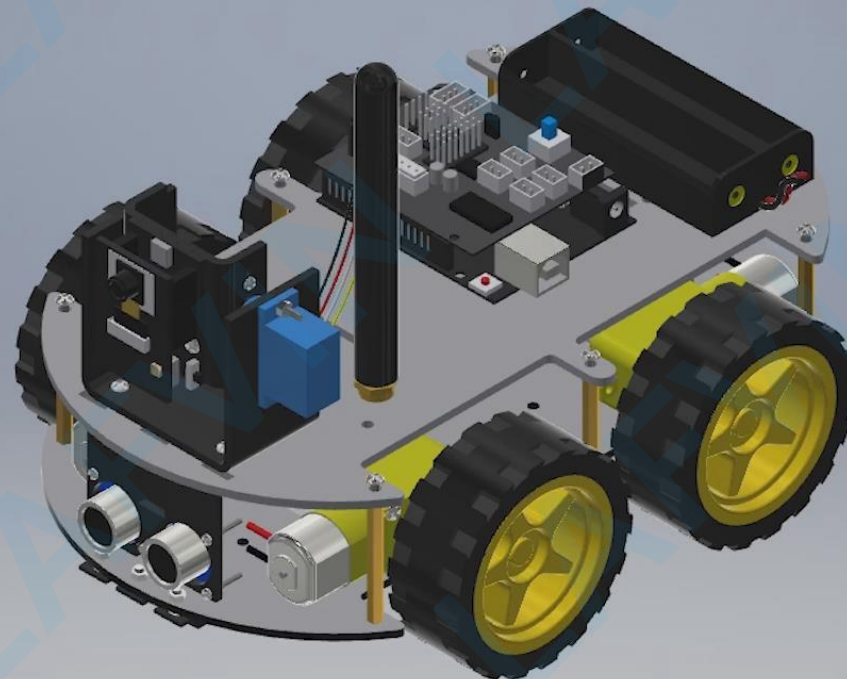
LAFVIN



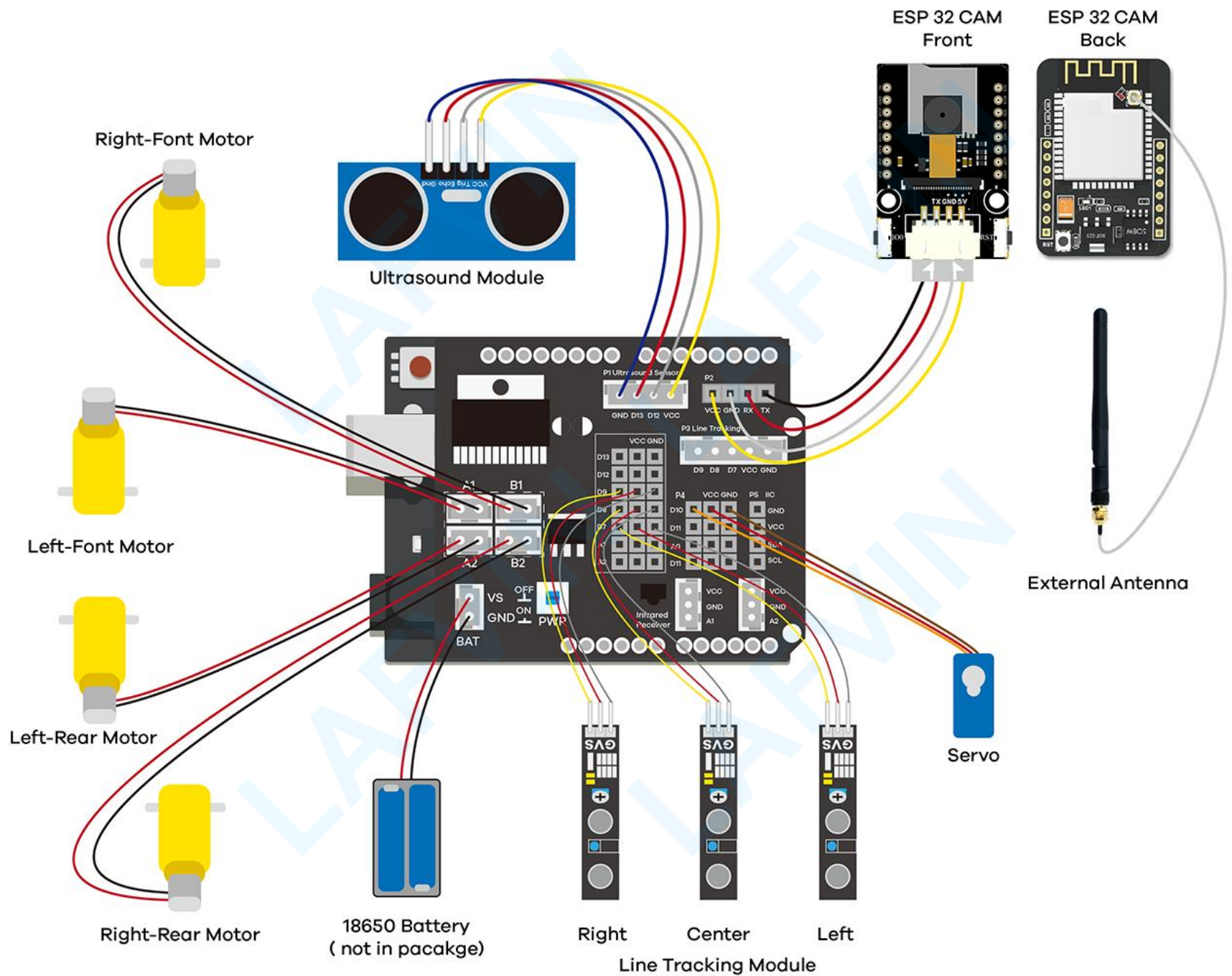
M3 * 10 mm Screw



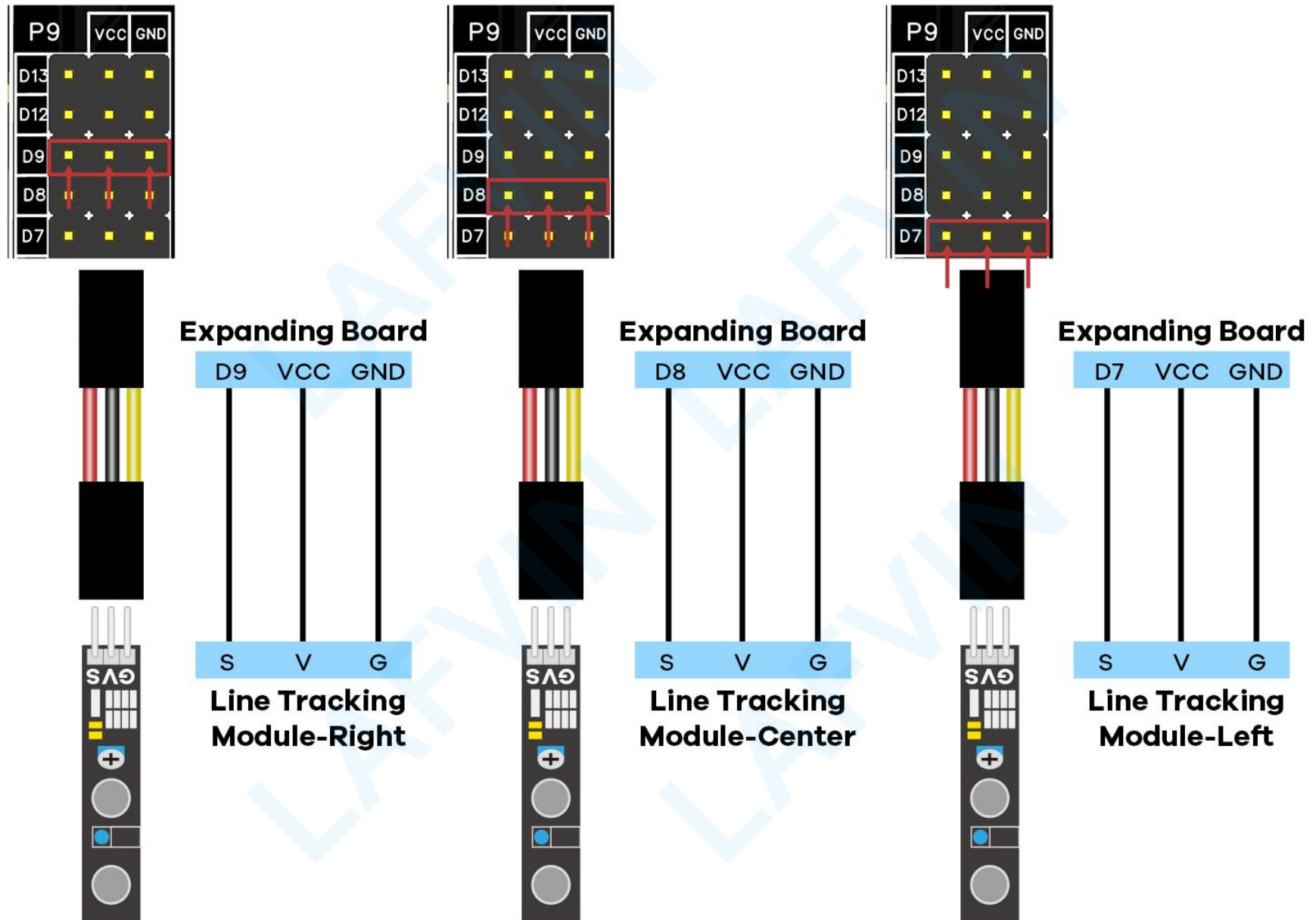
M3 * 10 mm Screw



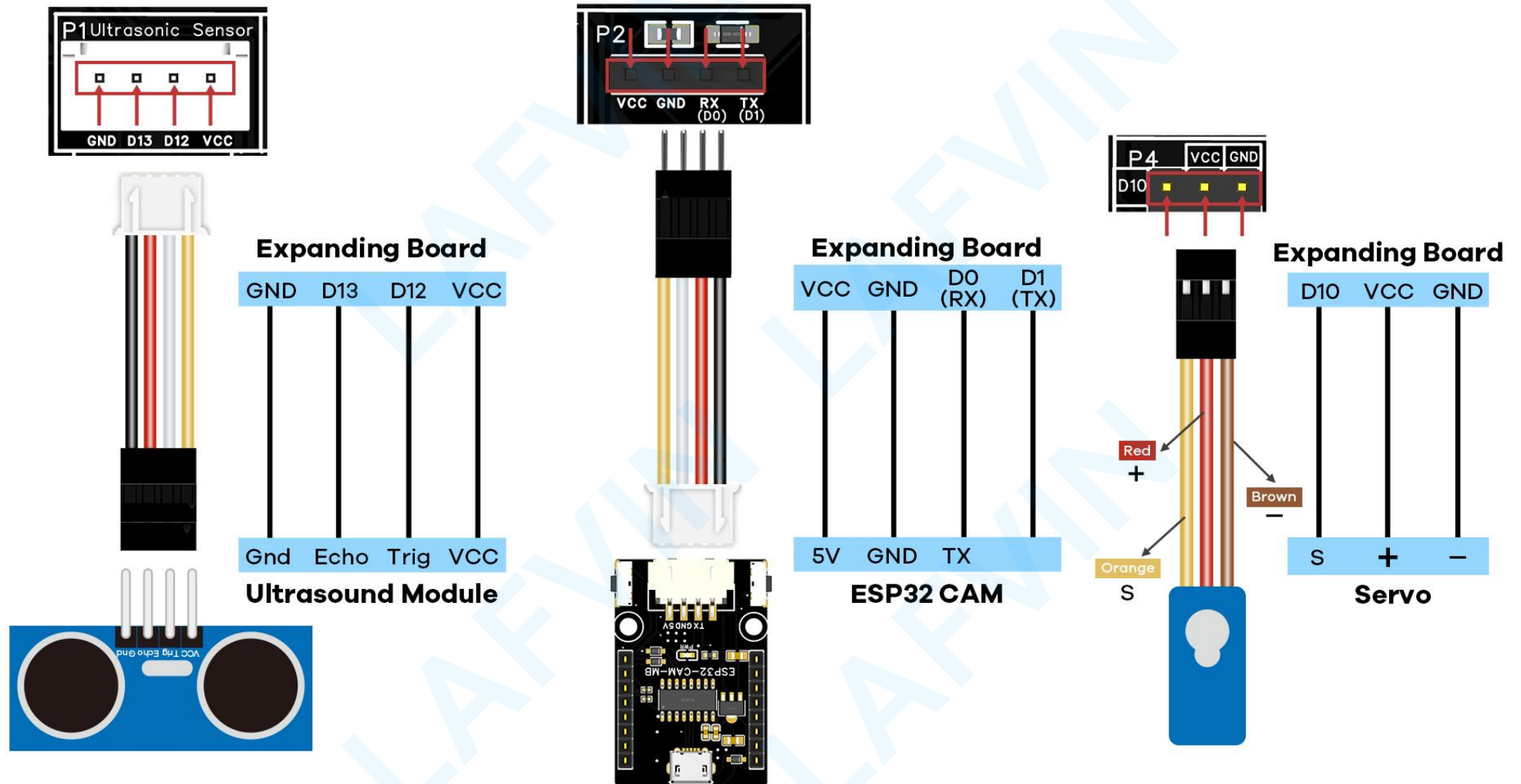
LAFVIN



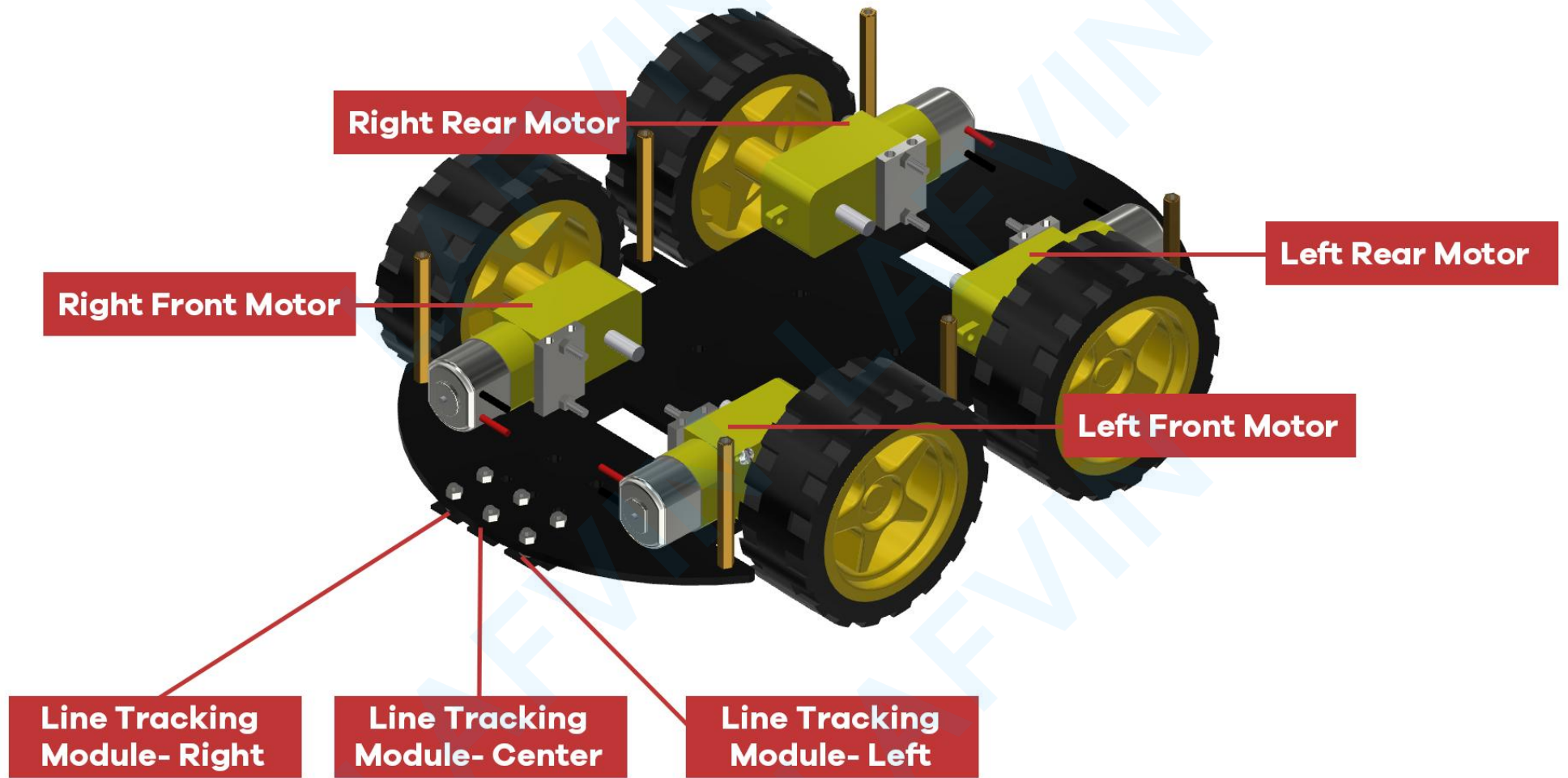
LAFVIN



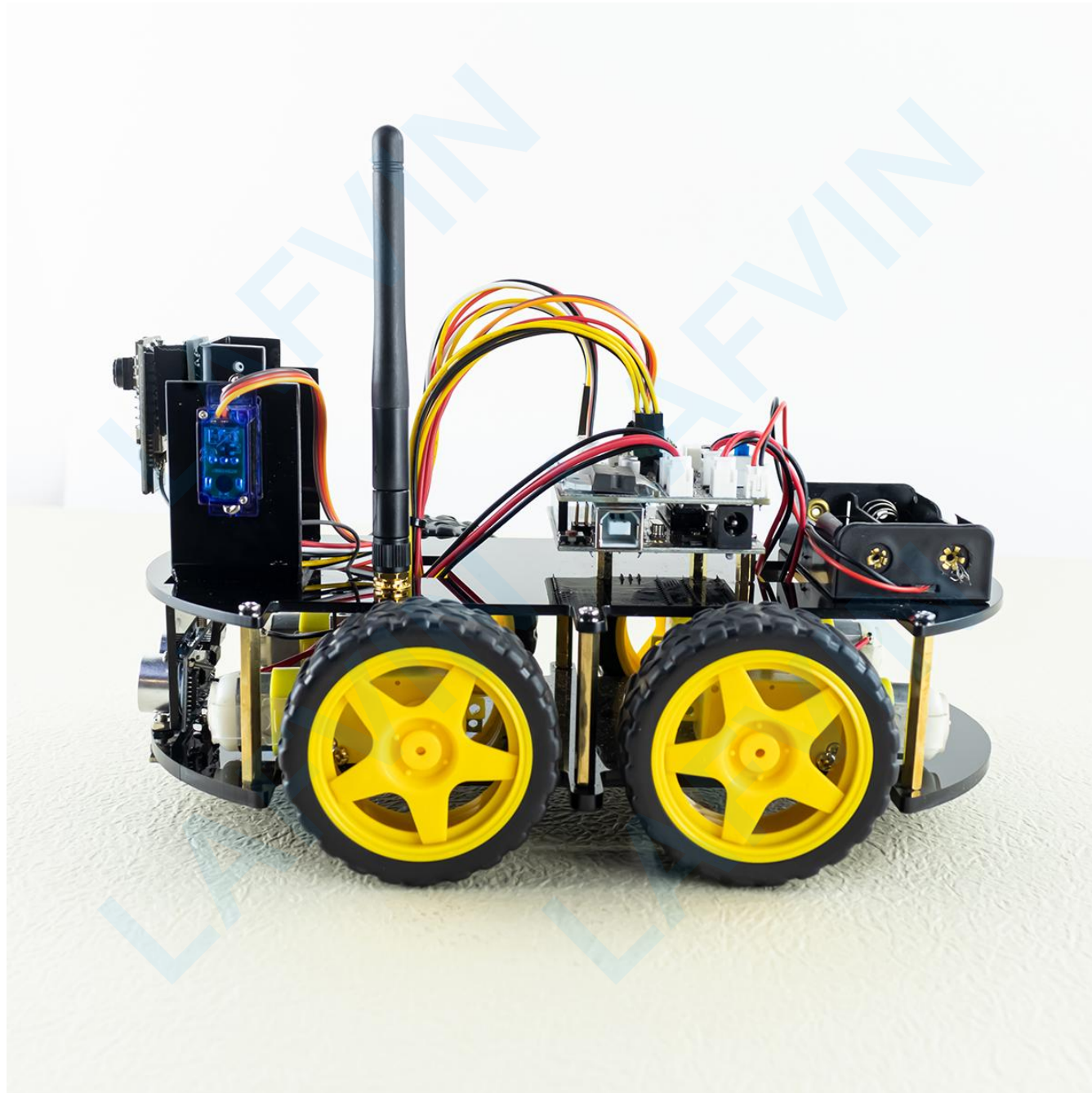
LAFVIN



LAFVIN



LAFVIN



LAFVIN



◆ Step 2: Install Arduino IDE

Go to <https://www.arduino.cc/en/Main/Software>. If you have questions about the installation of Arduino IDE, you can refer to [Getting Started with Arduino products](#).

Before starting this installation procedure, make sure you have the latest version of the Arduino IDE installed in your computer. If you don't, uninstall it and install it again. Otherwise, it may not work.

Downloads



 **Arduino IDE 1.8.19**

The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. This software can be used with any Arduino board.

Refer to the [Getting Started](#) page for Installation instructions.

SOURCE CODE

Active development of the Arduino software is [hosted by GitHub](#). See the instructions for [building the code](#). Latest release source code archives are available [here](#). The archives are PGP-signed so they can be verified using [this](#) gpg key.

DOWNLOAD OPTIONS

- Windows** Win 7 and newer
- Windows** ZIP file
- Windows app** Win 8.1 or 10 
- Linux** 32 bits
- Linux** 64 bits
- Linux** ARM 32 bits
- Linux** ARM 64 bits
- Mac OS X** 10.10 or newer

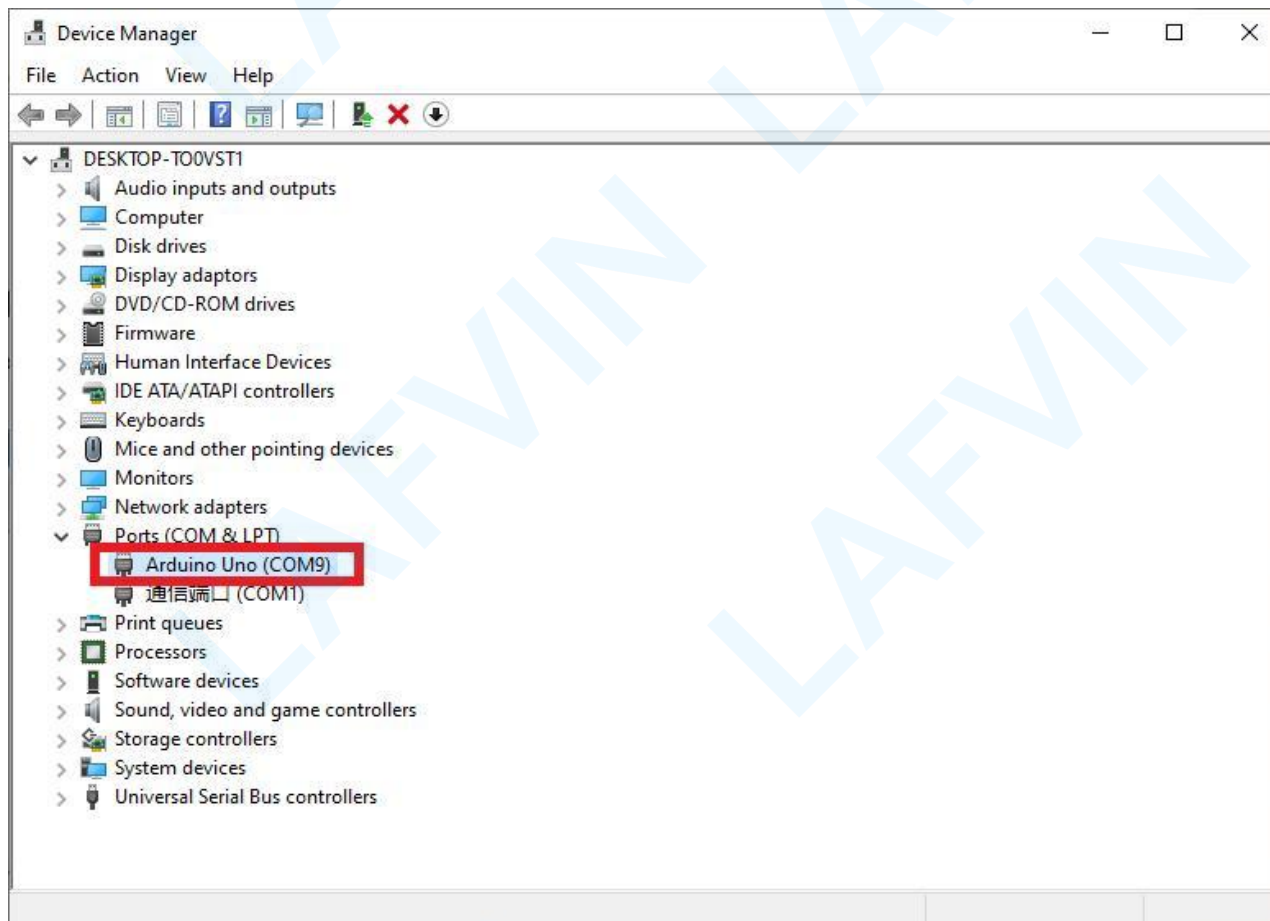
[Release Notes](#)

[Checksums \(sha512\)](#)

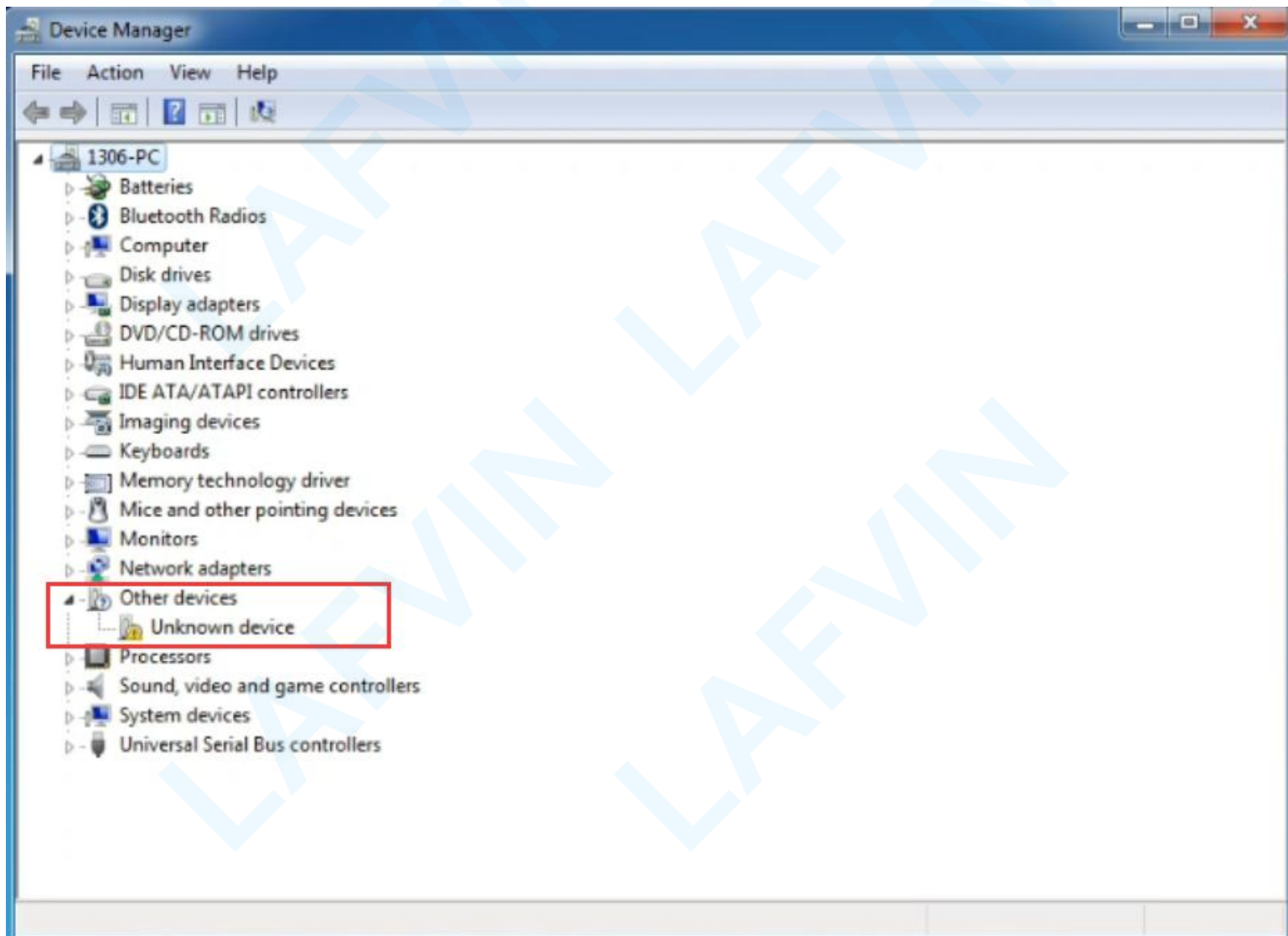
◆ Step 3: Install Arduino UNO Driver

① Plug in your Arduino UNO board. Navigate to the Windows Device Manager (Start > type 'device manager' to search > double click the first result to launch the Device Manager).

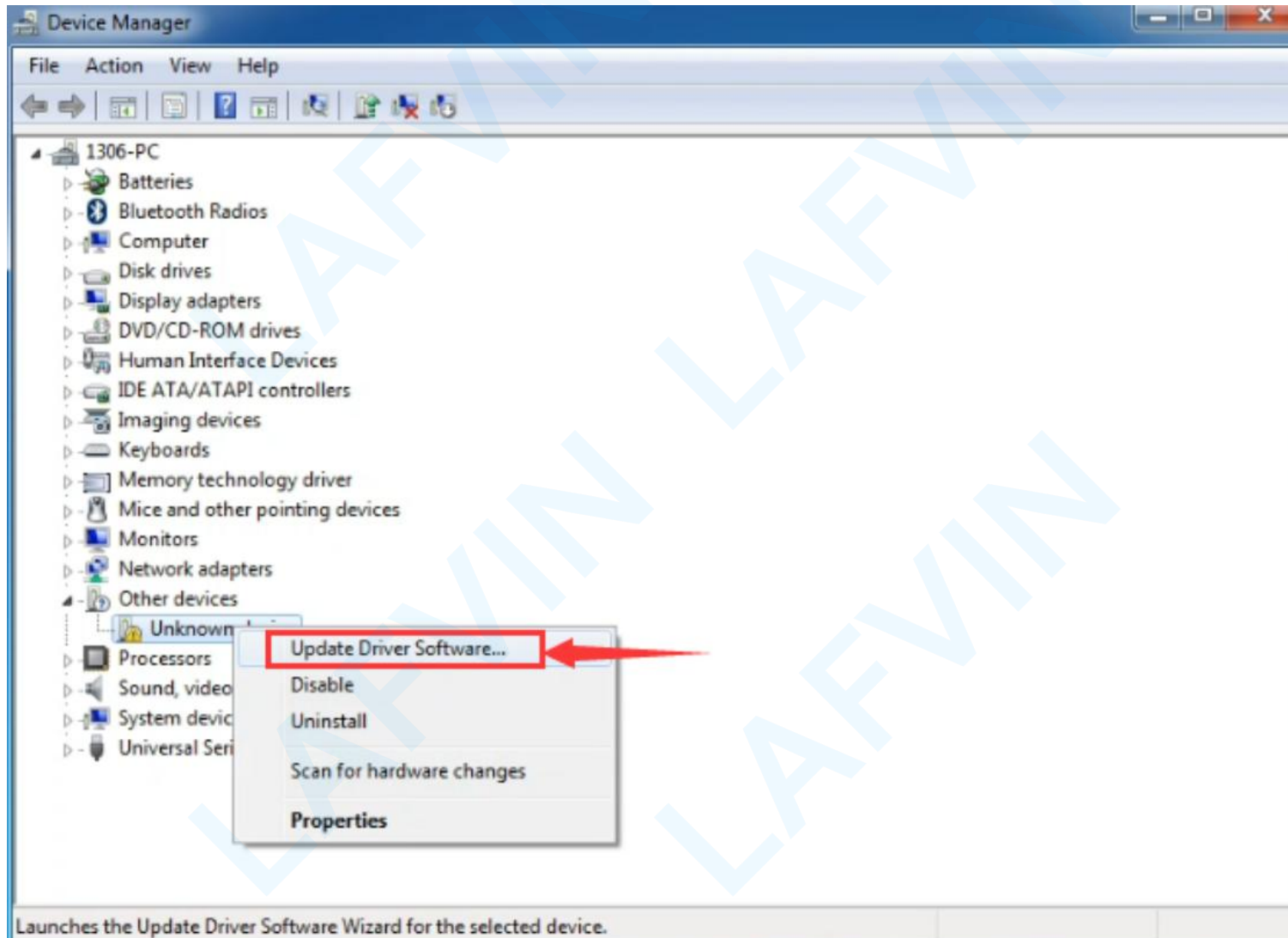
Go to the port, if "**Arduino UNO (COMX)**" appears in the port list, it means that the Arduino Uno driver has been successfully installed. you can skip this step.



②If you can't find the Arduino UNO (COMX) port, go to "Other Devices" and find an “**Unknown device**” or an “**Arduino UNO**” list item with a yellow warning

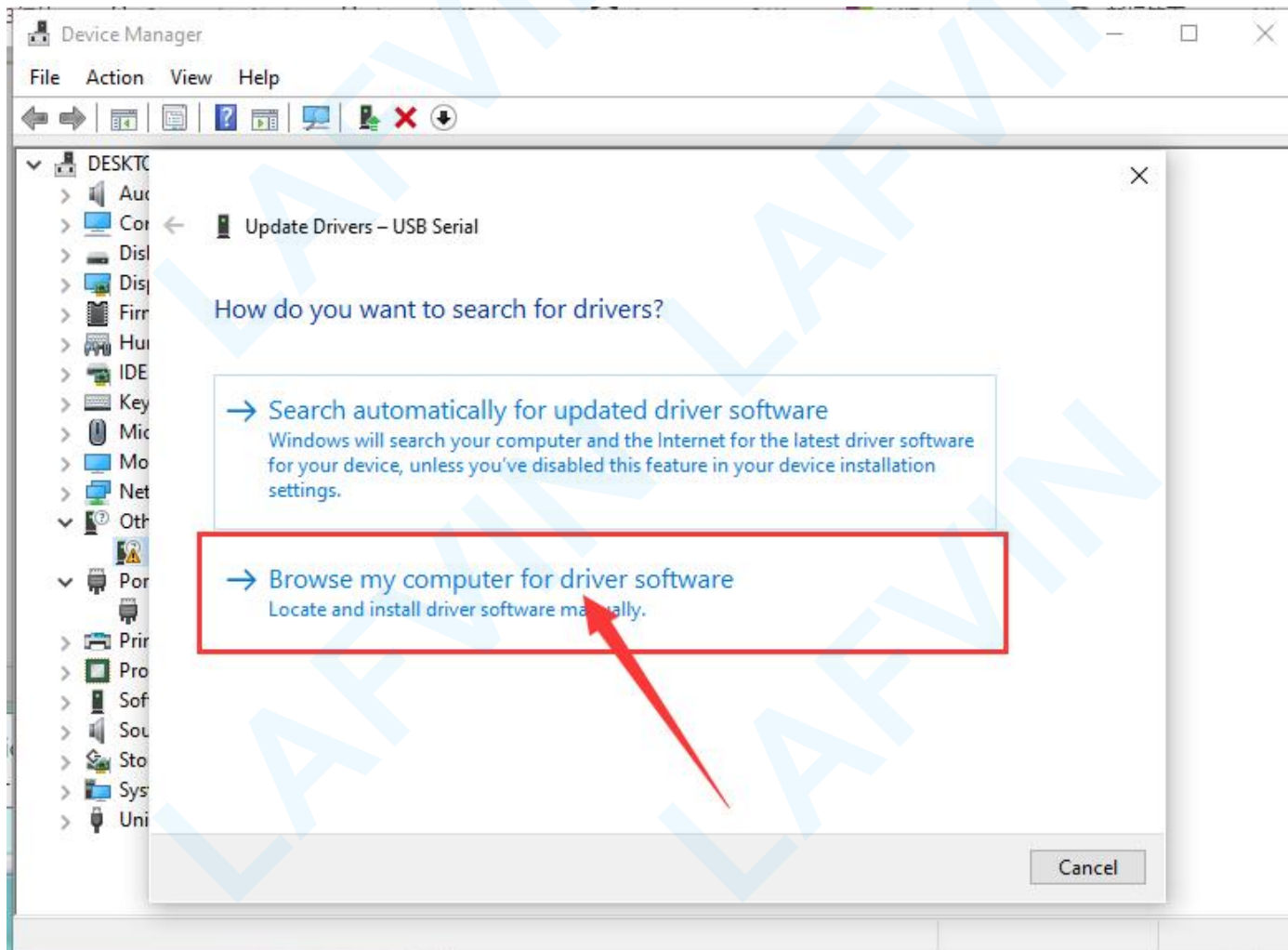


③ Then right-click on the device and select the top menu option (Update Driver Software...) shown as the figure below.



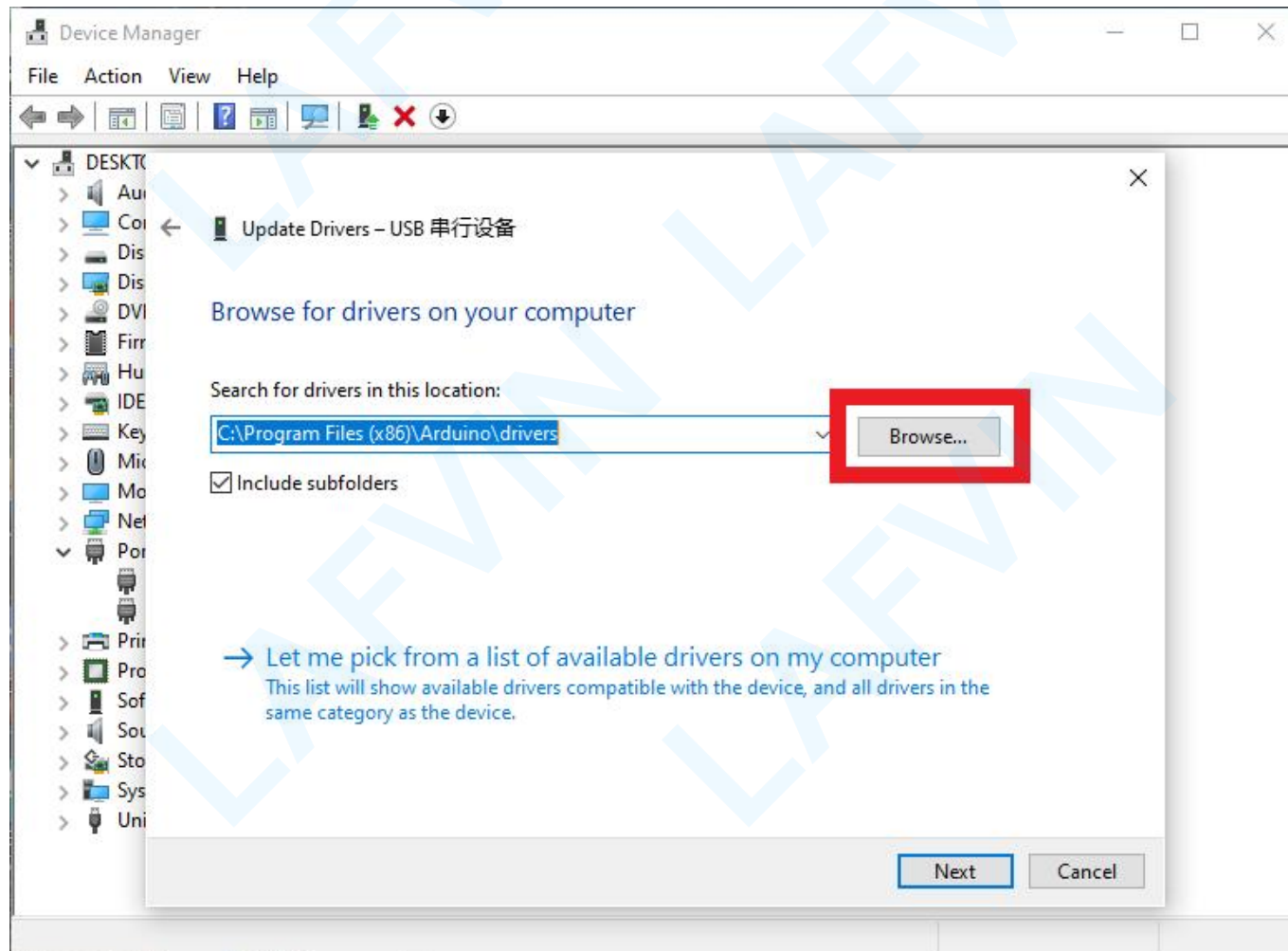
LAFVIN

④Then it will be prompted to either “Search Automatically for updated driver software” or “Browse my computer for driver software”. Shown as below. In this page, select “Browse my computer for driver software”.



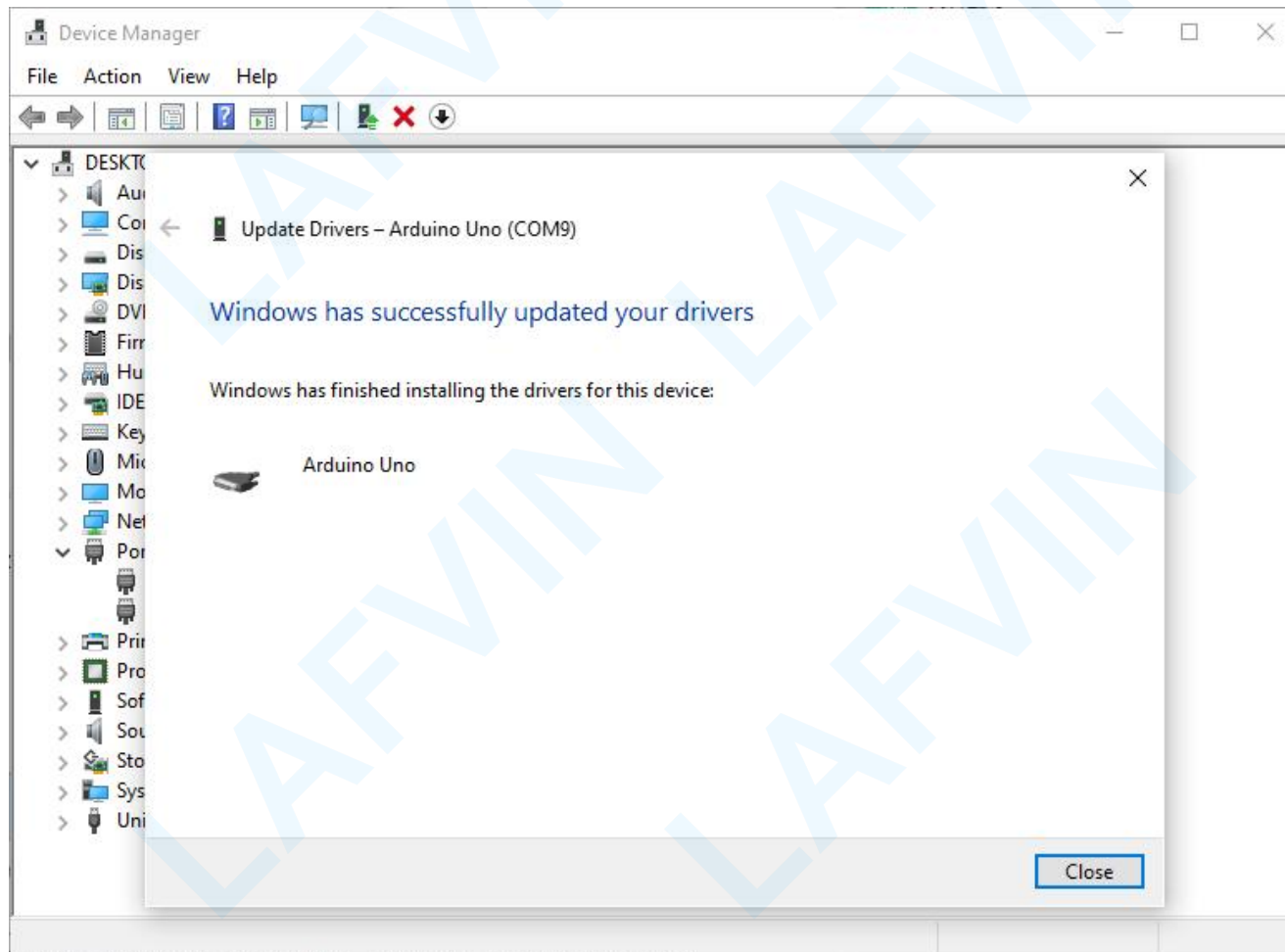
⑤ Right-click on the device and select the top menu option (Update Driver Software...).

Select the option to browse and navigate to the **C:\Program Files(x86)\Arduino\drivers**. (Note: Here is the path you choose to install Arduino IDE. Since I installed the Arduino IDE on the C disk, so the location path I chose is **C:\Program Files(x86)\Arduino\drivers**)

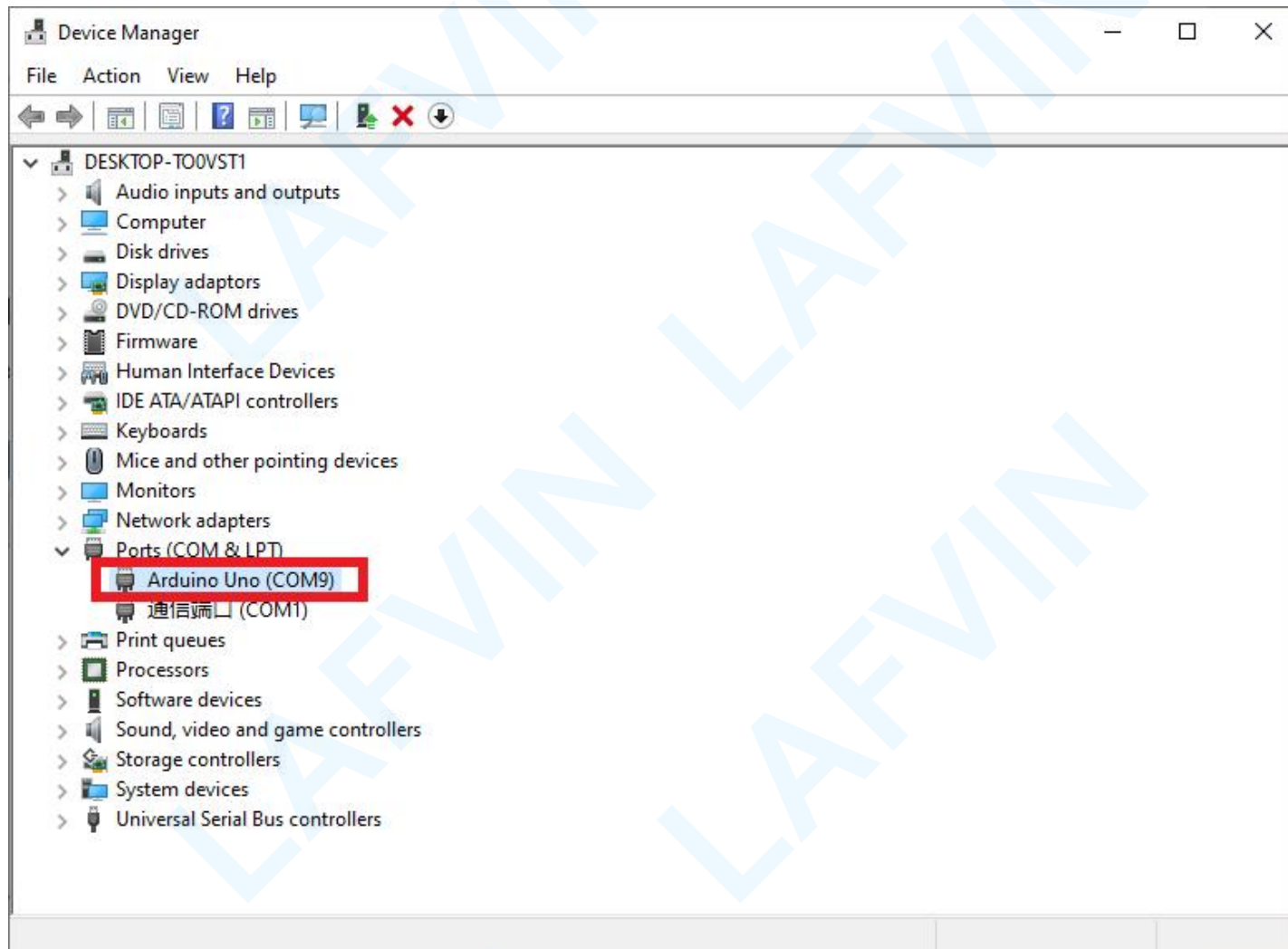


⑥Click “Next” and you may get a security warning, if so, allow the software to be installed.

Once the software has been installed, you will get a confirmation message. Installation completed,click “Close”.



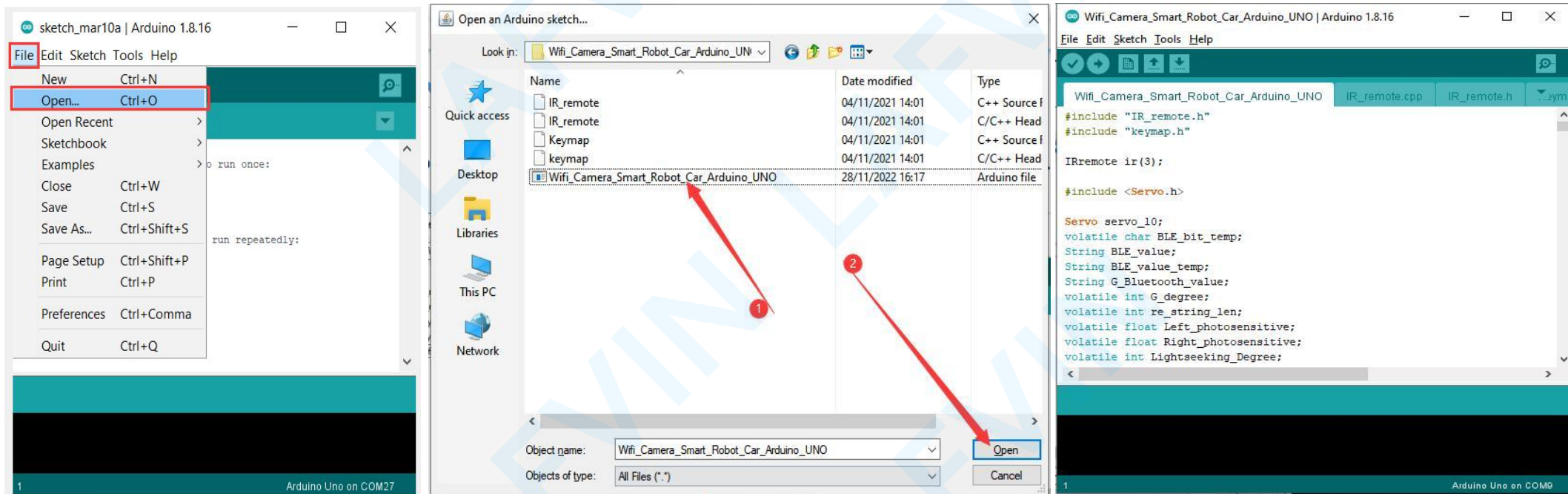
Up to now, the driver is installed well. Then you can right click “Computer”—>“Properties”—>“Device manager” , you should see the device as the figure shown below.



◆ Step 4: Upload Arduino UNO Main Code

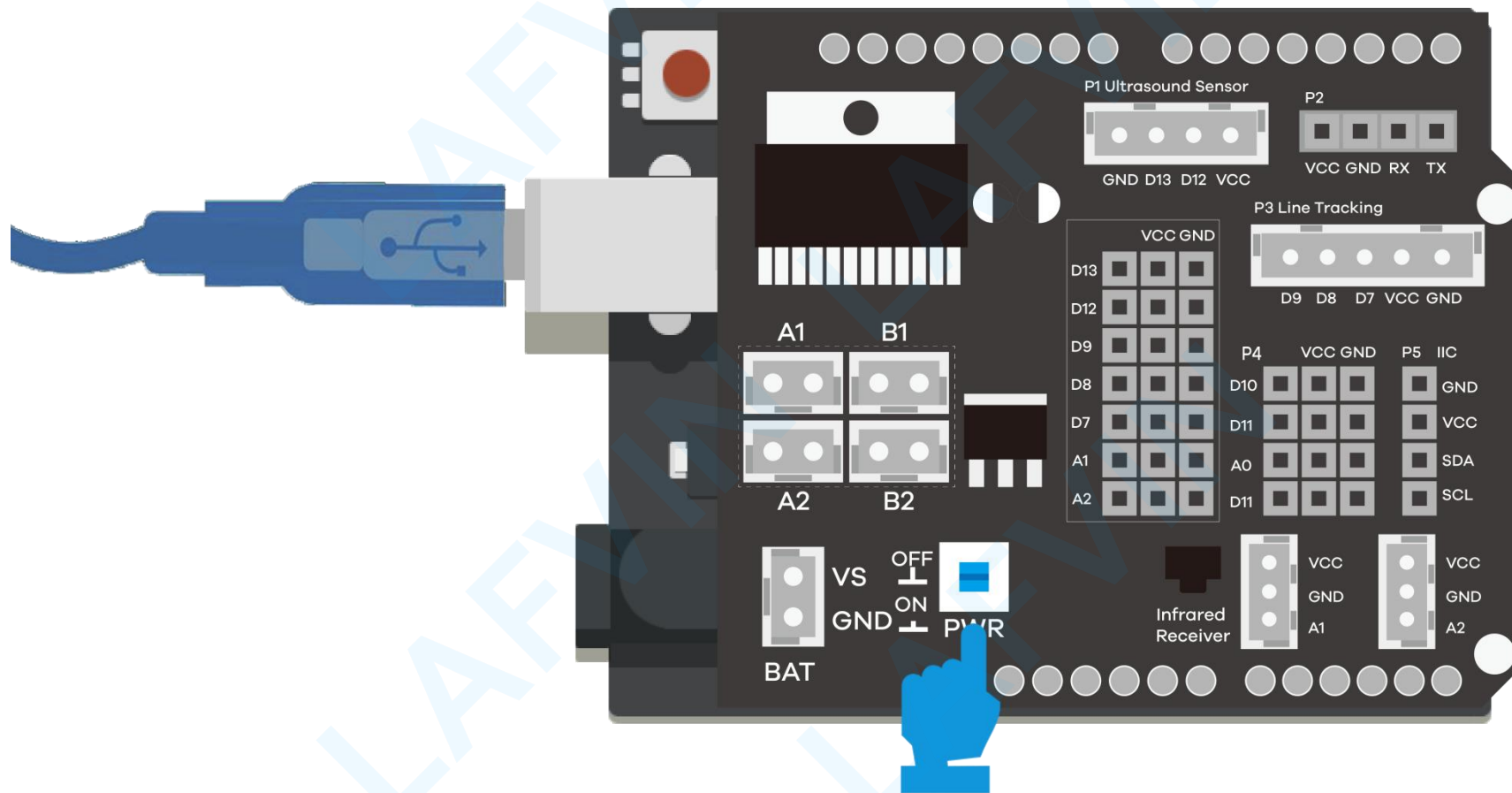
① Start Arduino IDE, open the code in

File->Open...->->Main Program>Wifi_Camera_Smart_Robot_Car_Arduino_UNO.ino

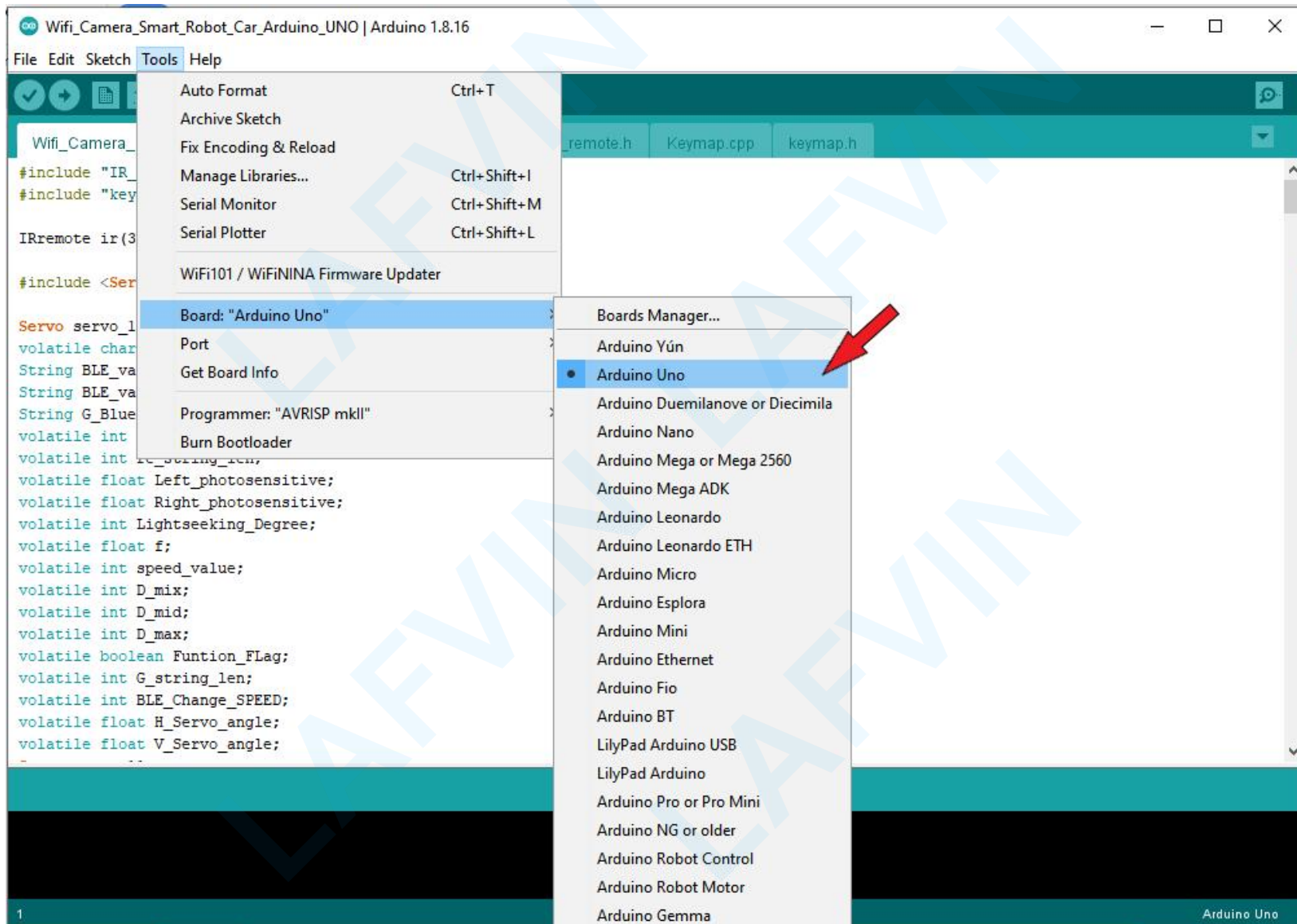


LAFVIN

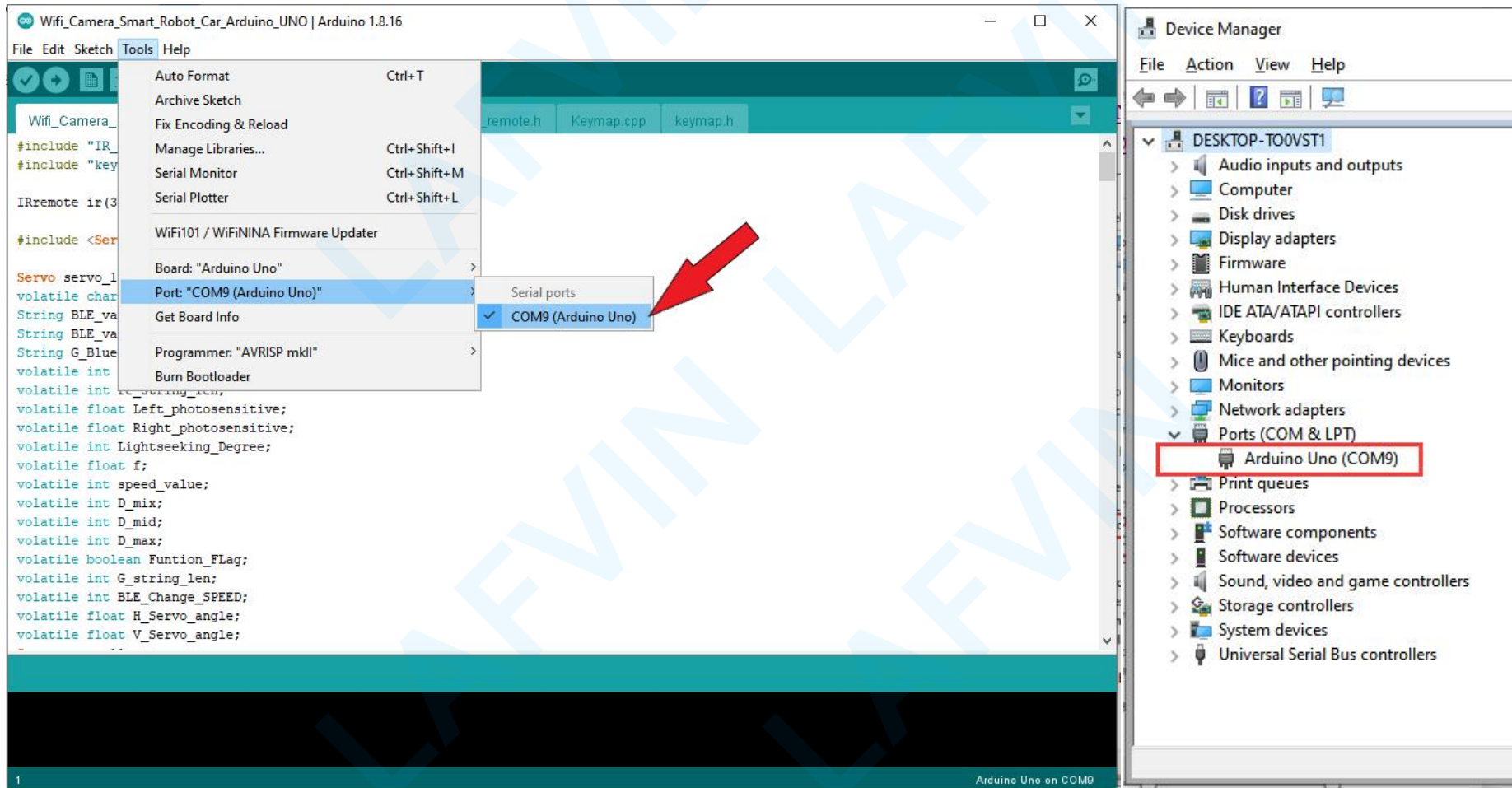
② Plug the Arduino UNO board to your computer. (It may be that the power supply of the USB interface of the computer is insufficient, you can turn on the power switch of the robot car at the same time.)



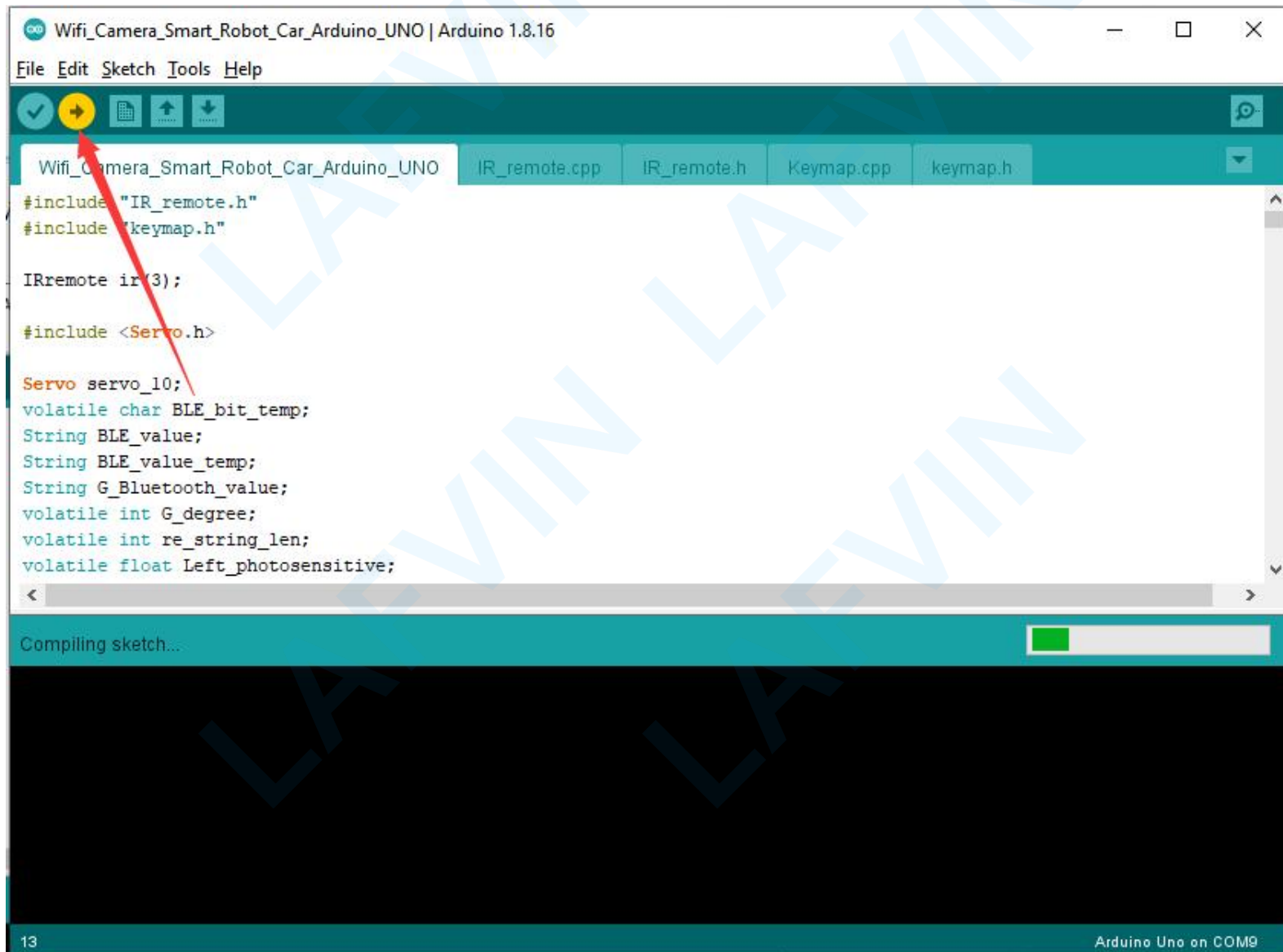
③ Select your Board in **Tools > Board menu > Arduino UNO**



④ Select the Port (if you don't see the COM Port in your Arduino IDE, you need to [Install the Arduino UNO Drivers](#))



⑤ Click the Upload button in the Arduino IDE. Wait a few seconds while the code compiles and uploads to your board.

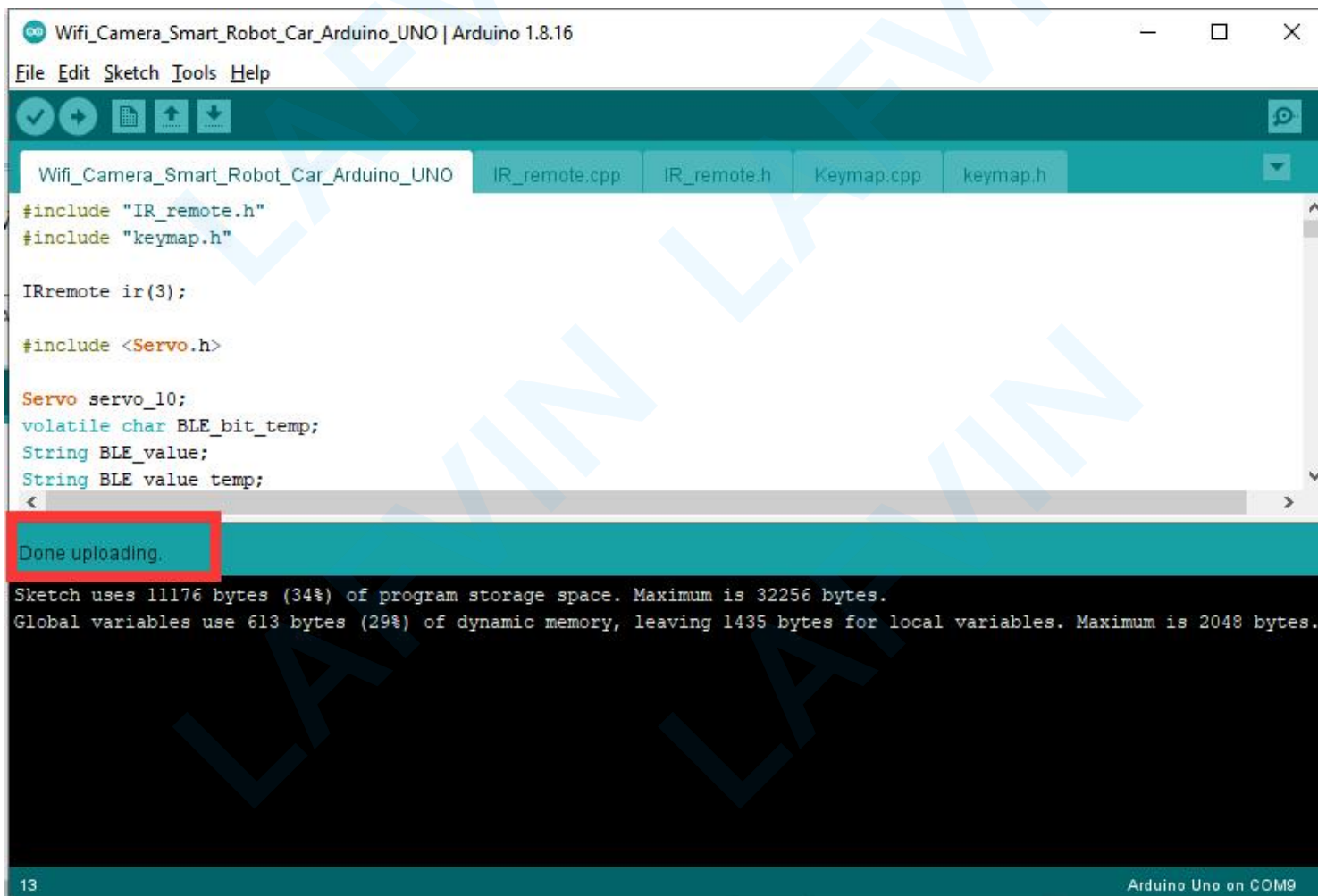


If everything went as expected, you should see a “Done uploading.” message. If the Arduino IDE reports errors maybe you missed some steps. Arduino getting started guide is as follows

[Upload a sketch in Arduino IDE](#)

[Errors when uploading a sketch](#)

[Getting Started with Arduino products](#)



The screenshot shows the Arduino IDE window titled "Wifi_Camera_Smart_Robot_Car_Arduino_UNO | Arduino 1.8.16". The menu bar includes File, Edit, Sketch, Tools, and Help. The toolbar contains icons for checkmark, refresh, upload, and download. The file explorer shows the current sketch and its associated header and source files: Wifi_Camera_Smart_Robot_Car_Arduino_UNO, IR_remote.cpp, IR_remote.h, Keymap.cpp, and keymap.h. The code editor displays the following code:

```
#include "IR_remote.h"
#include "keymap.h"

IRremote ir(3);

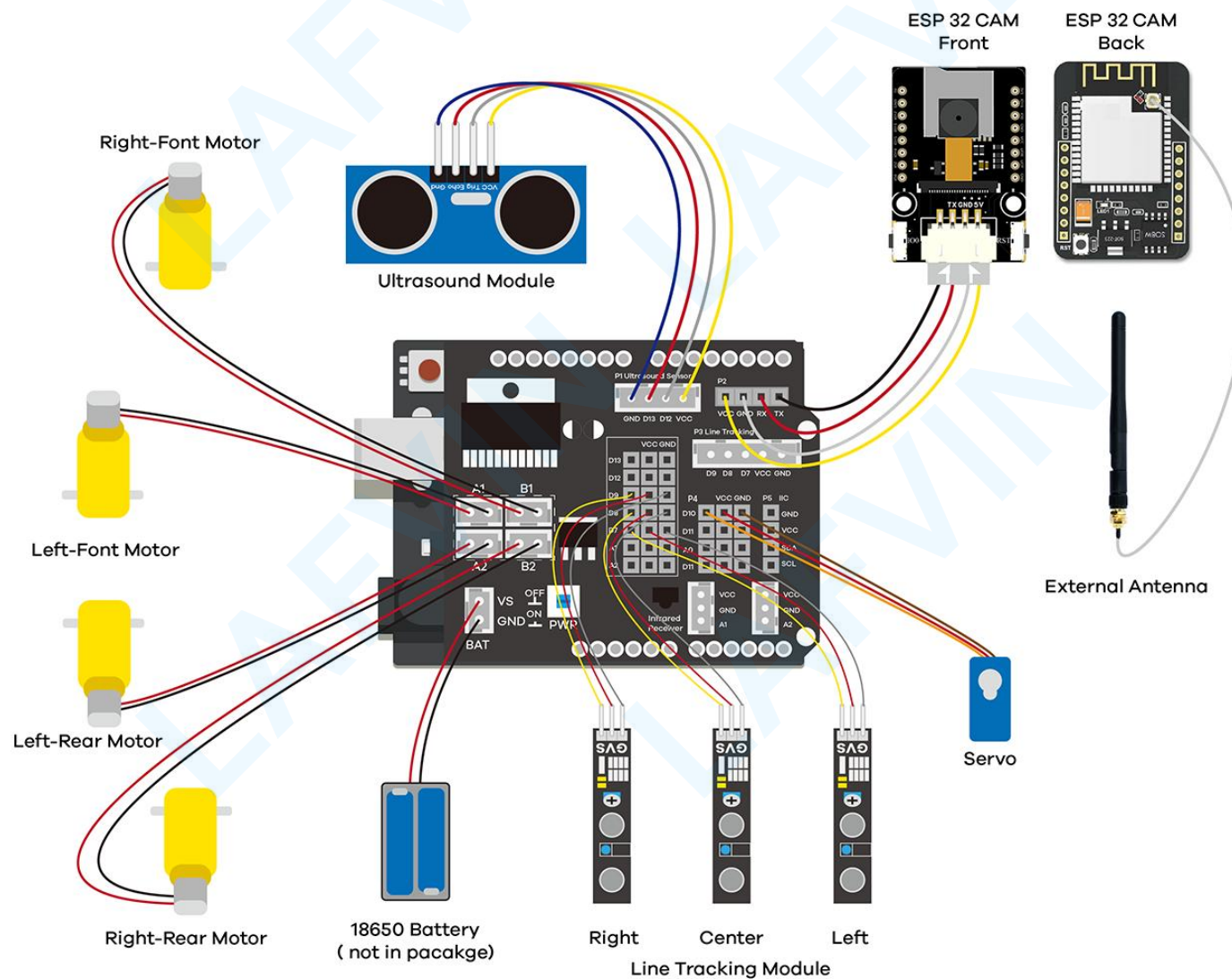
#include <Servo.h>

Servo servo_10;
volatile char BLE_bit_temp;
String BLE_value;
String BLE value temp;
```

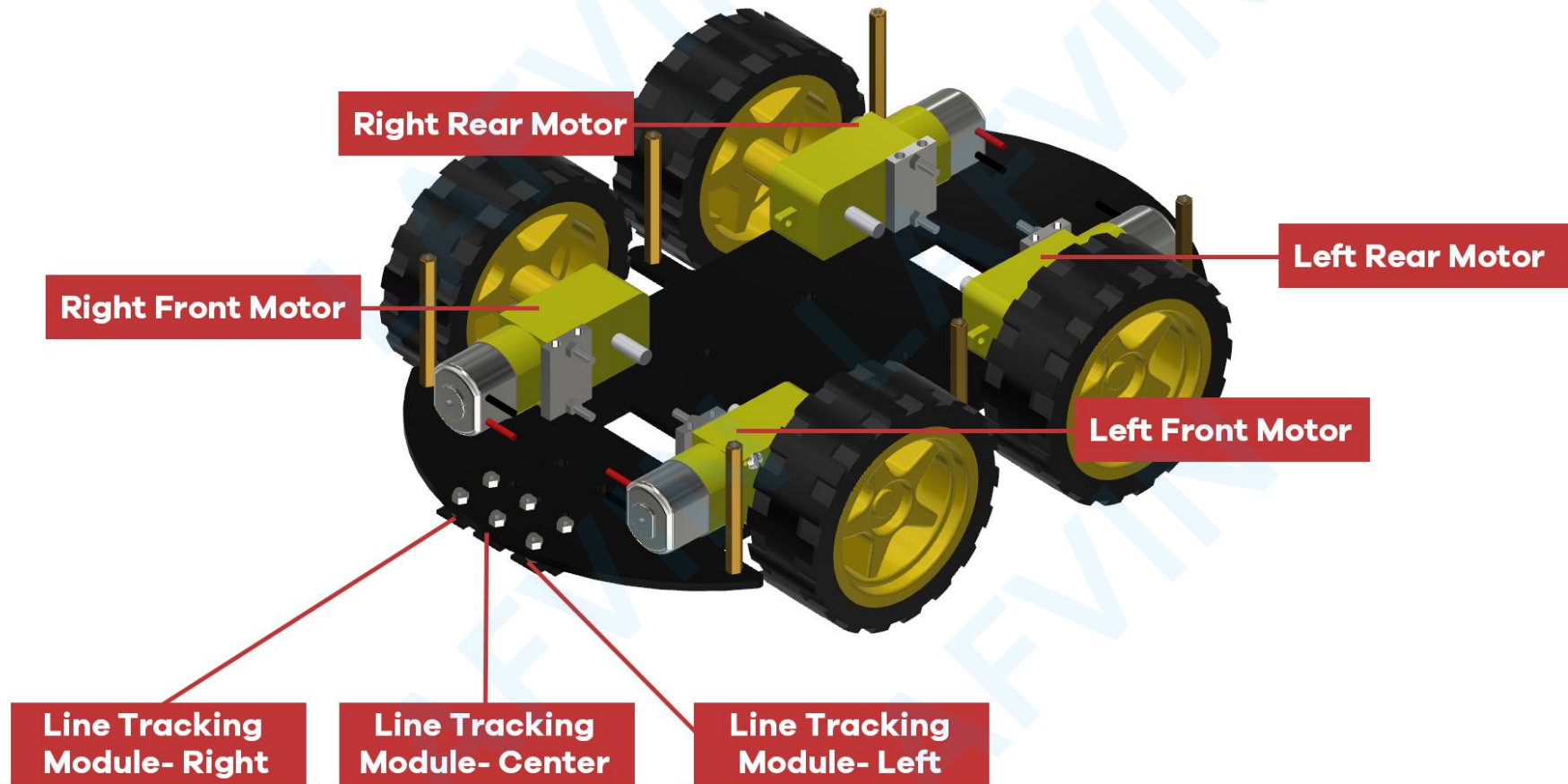
A red box highlights the status bar message: "Done uploading." Below this, the IDE displays memory usage information: "Sketch uses 11176 bytes (34%) of program storage space. Maximum is 32256 bytes. Global variables use 613 bytes (29%) of dynamic memory, leaving 1435 bytes for local variables. Maximum is 2048 bytes." The status bar at the bottom shows "13" on the left and "Arduino Uno on COM9" on the right.

◆ Step 5: Infrared Remote Control Robot Car

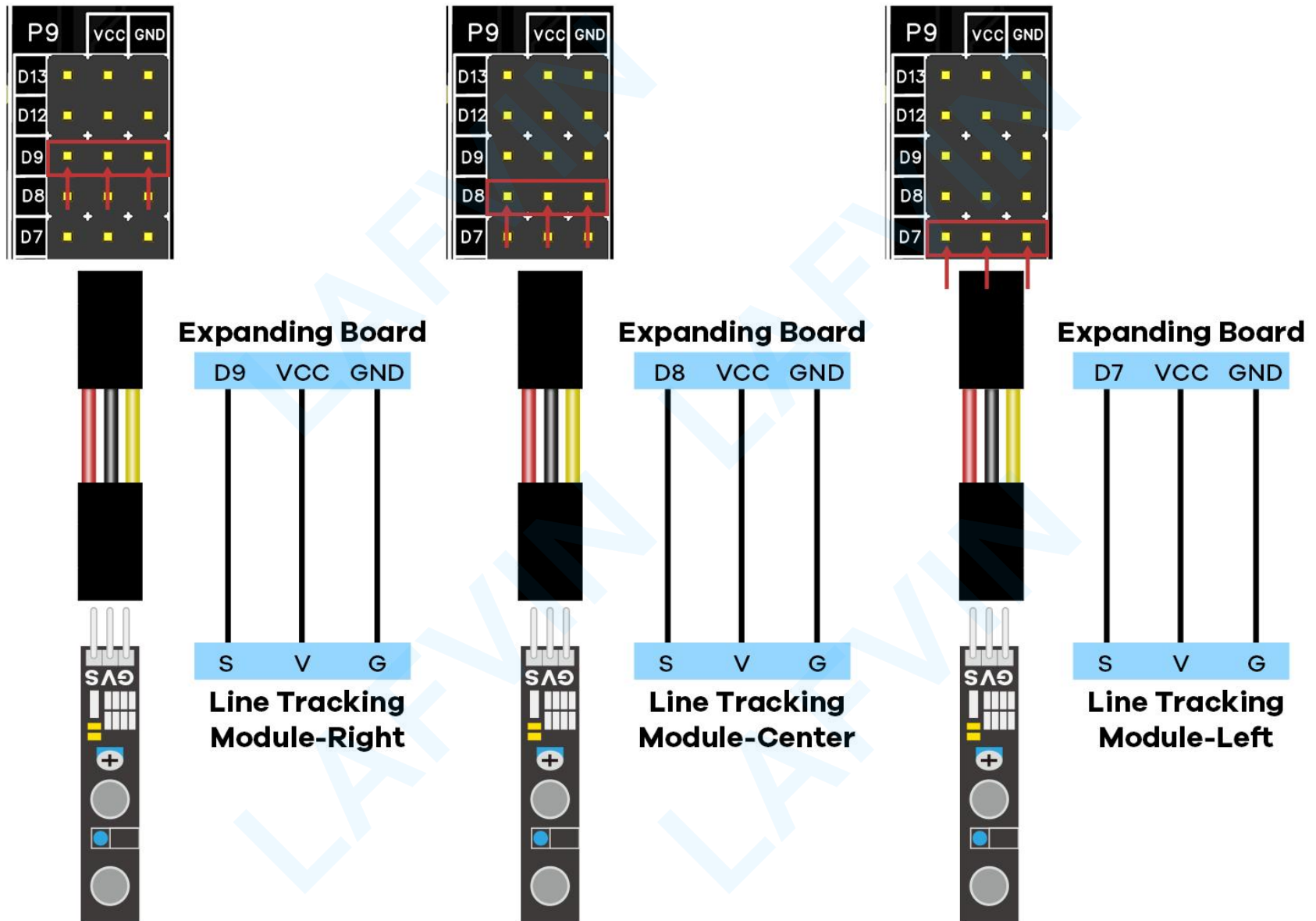
Check again whether the circuit wiring is correct, pay attention to the positive and negative marks of each interface. Turn on the power switch.

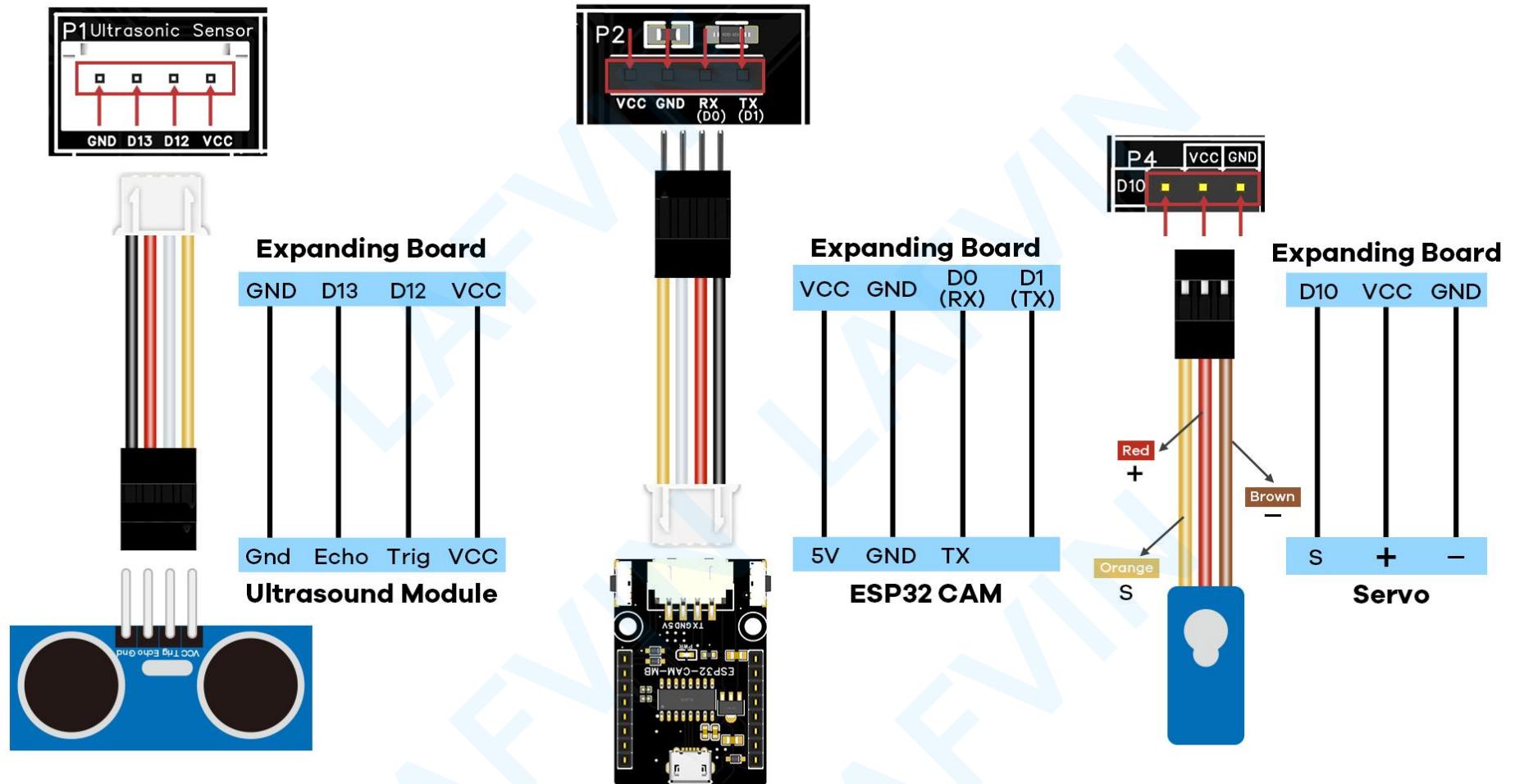


LAFVIN



LAFVIN





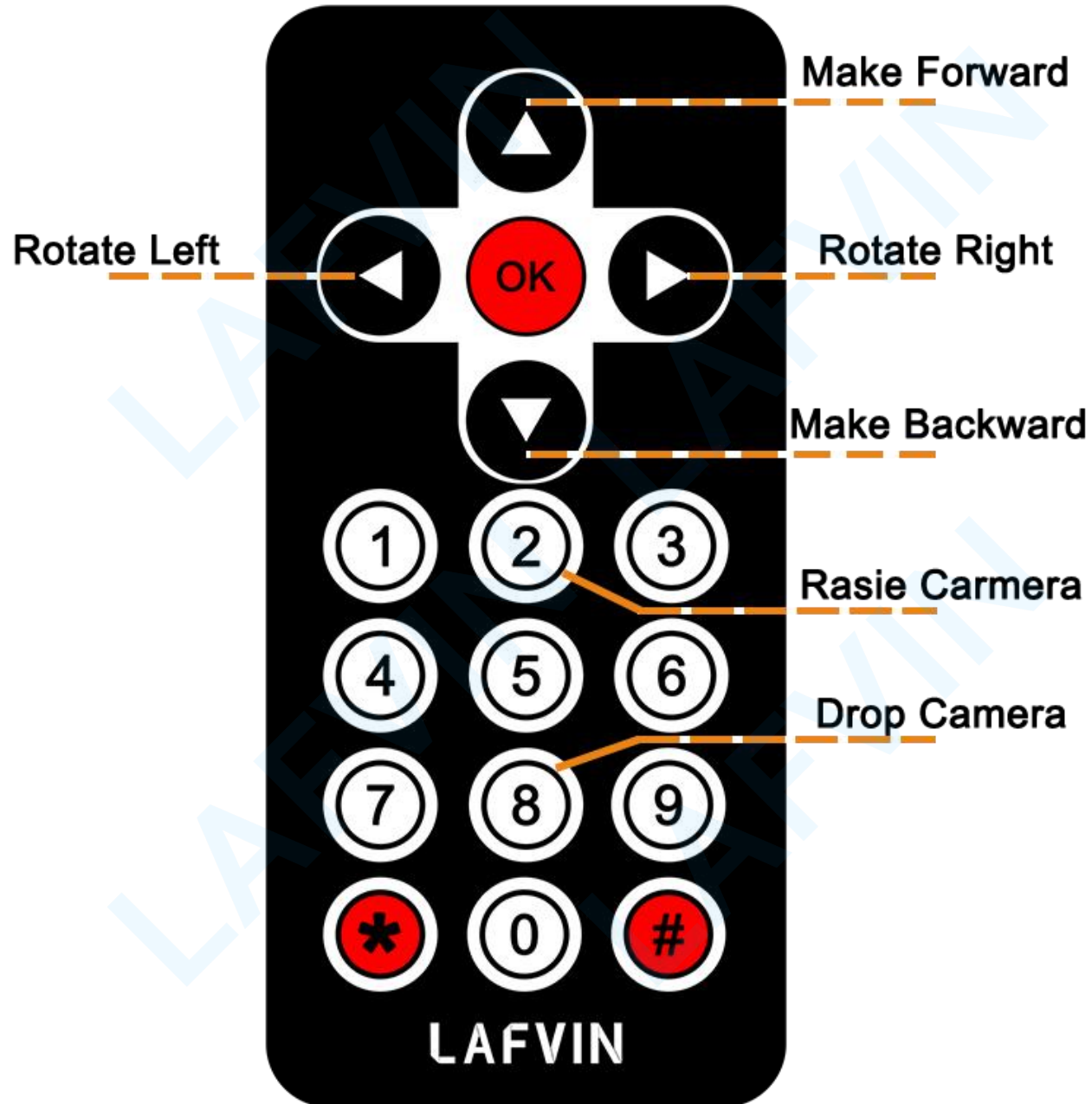
Use the infrared remote control function after successfully uploading the code of Arduino UNO.

Note:

- ① Due to air transportation requirements, maybe the infrared remote control does not contain the battery CR2025 3V. You need to prepare the battery yourself.
- ② The infrared remote control transmitter and receiver are in the same straight line, which will get better control effect.

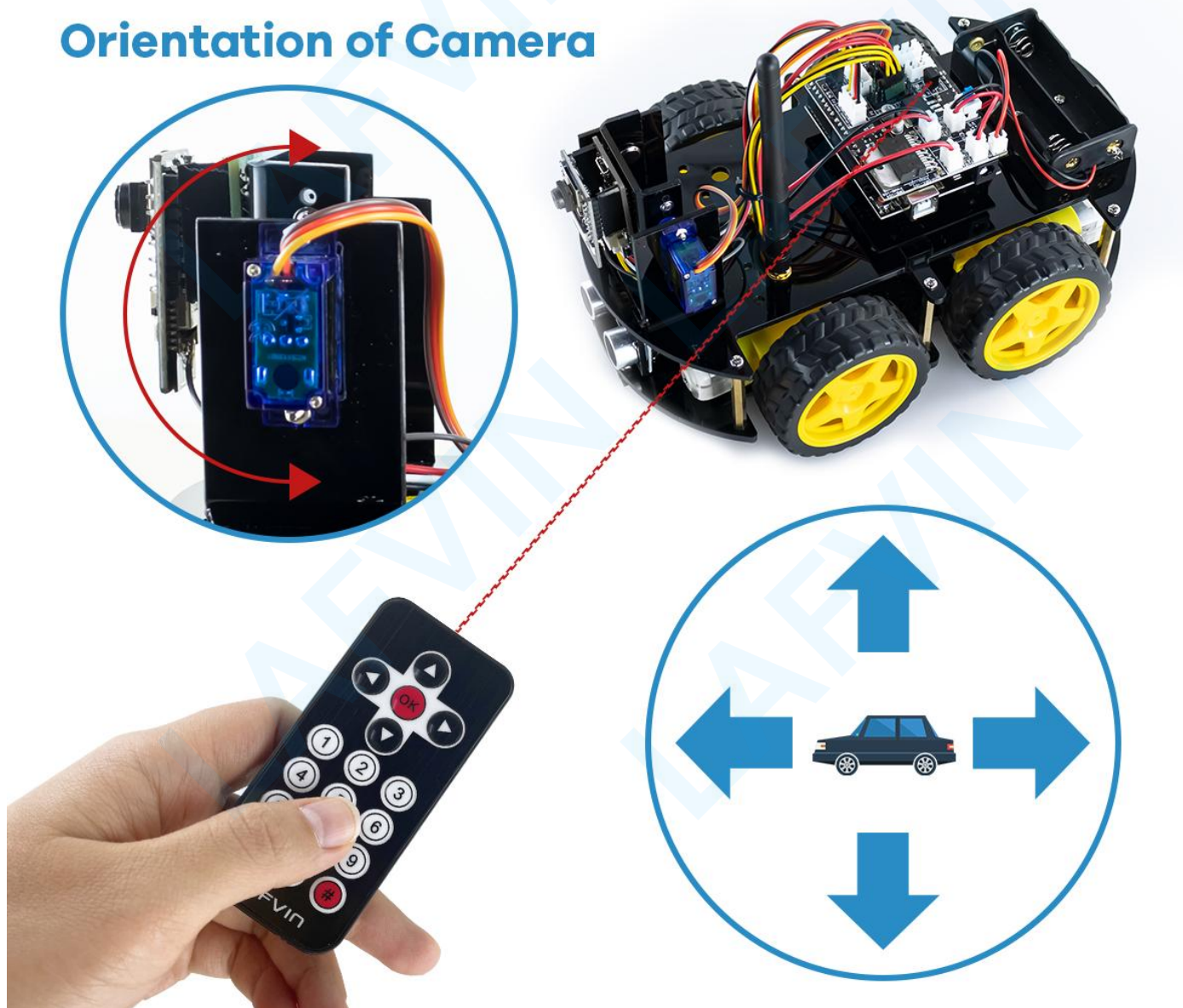


LAFVIN



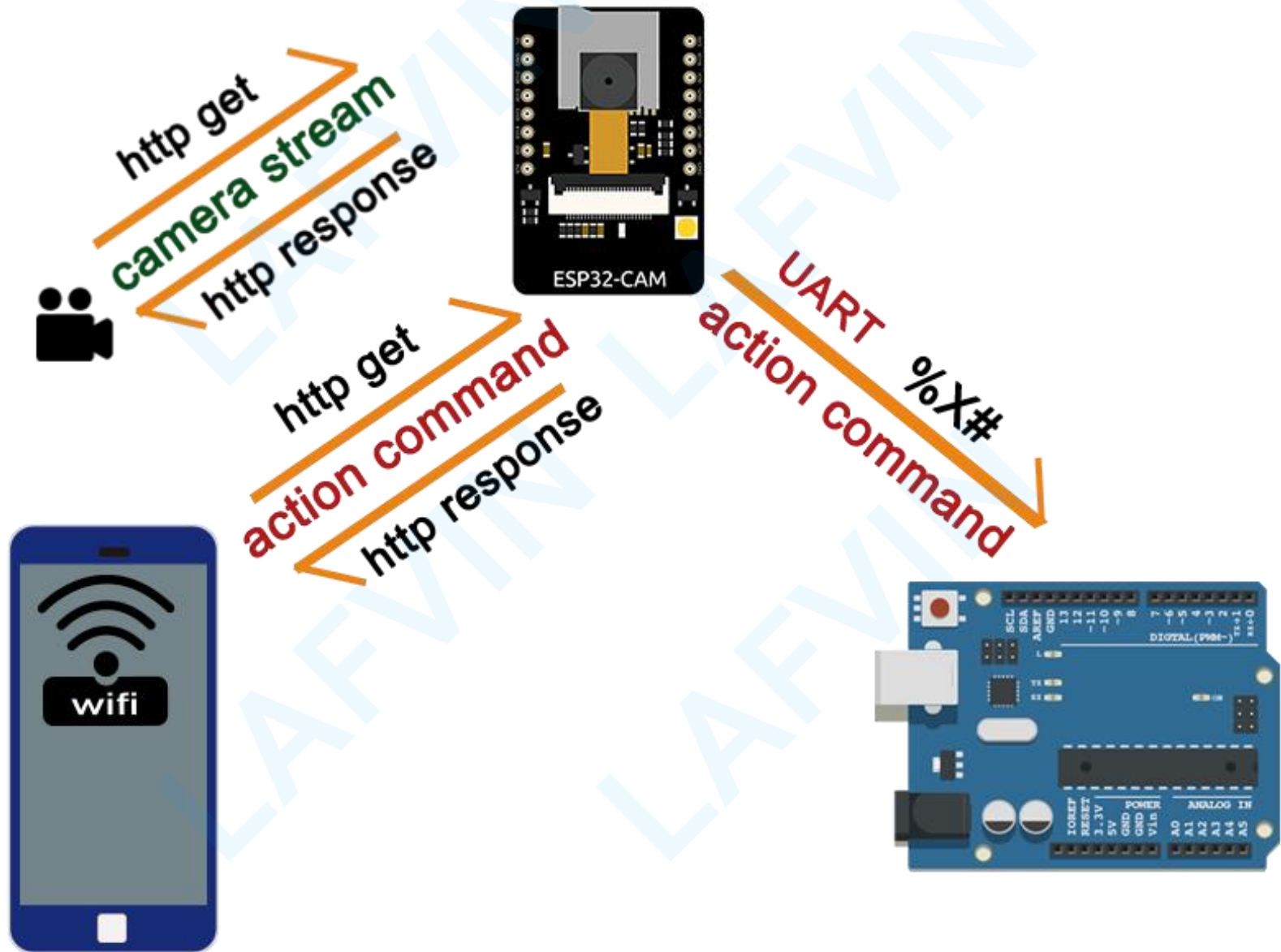
IR Control

Orientation of Camera



LAFVIN

◆ Step 6: APP Control Smart Robot Car



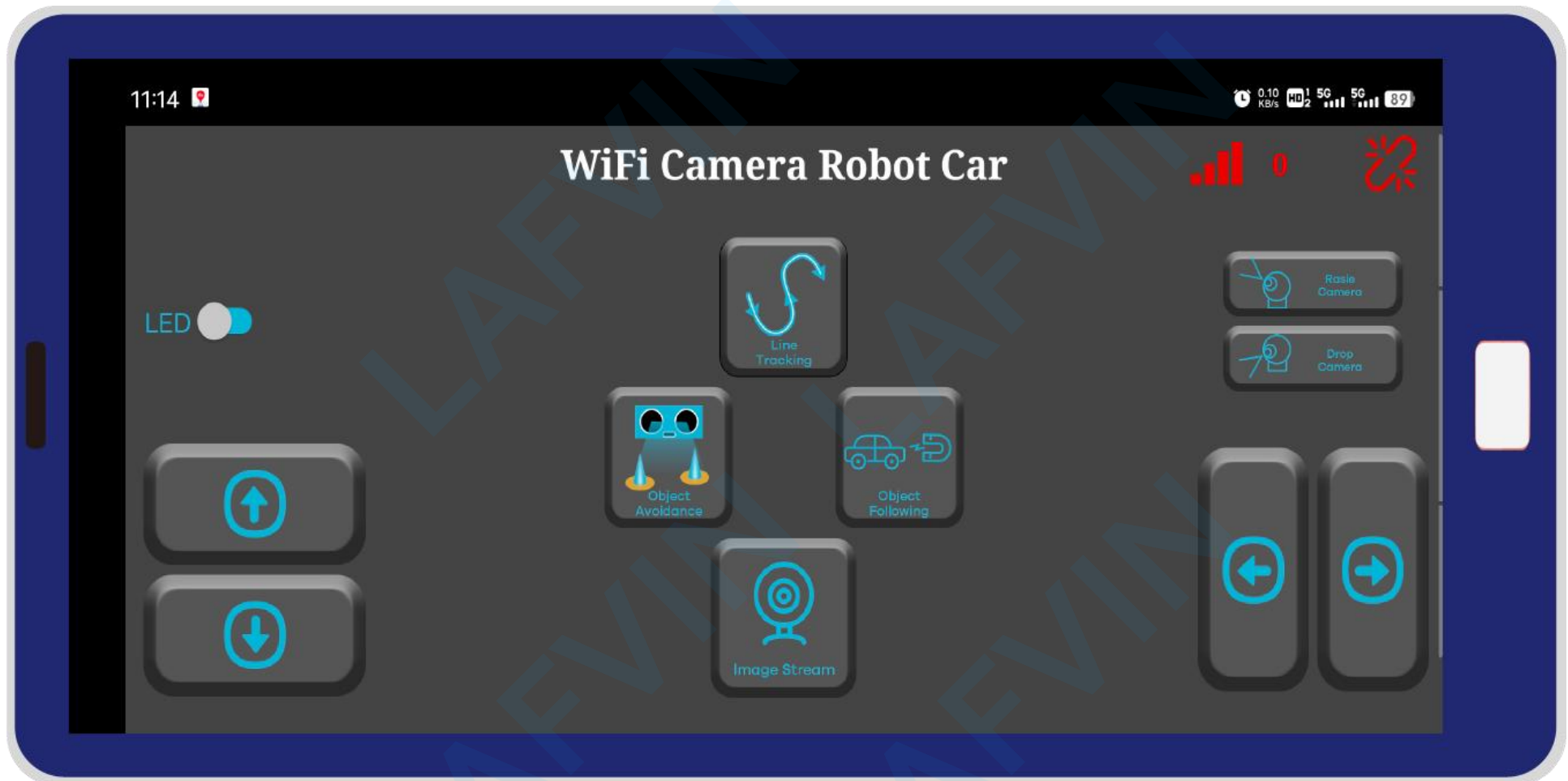
LAFVIN

① Install the .apk file to your phone(Only supports Android system)



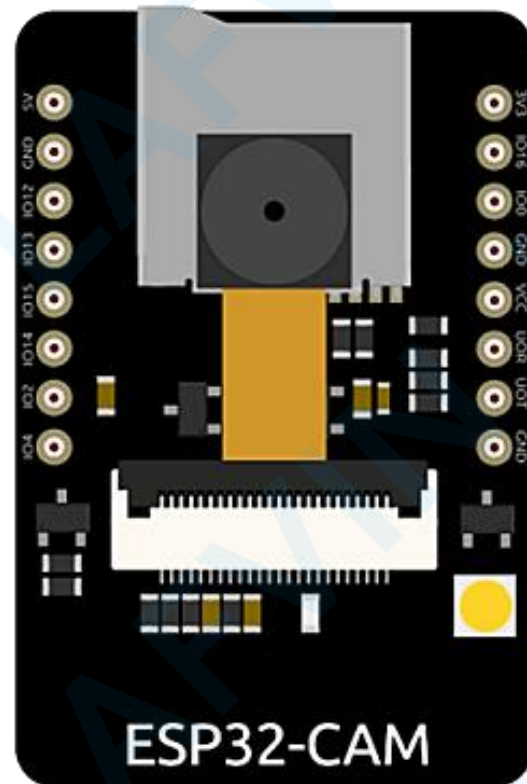
WiFi_Camera_Smart_Robot_Car.apk

LAFVIN



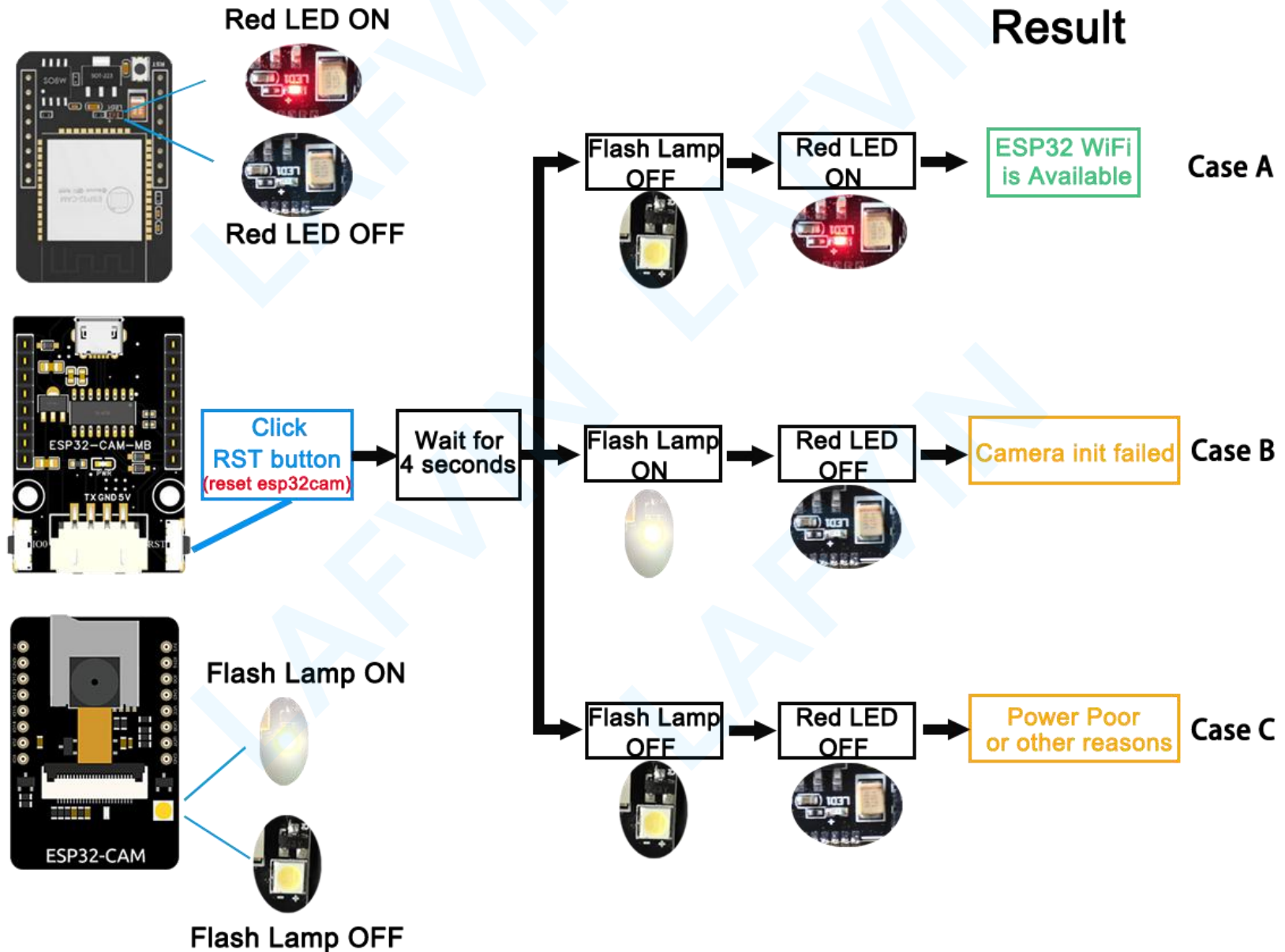
② Upload ESP32Cam program

Since the program has been uploaded to the ESP32Cam before the factory, you can just skip this step and no need to upload it repeatedly.



Done Uploading
Before factory

③ Turn on the power switch. Click the RST button to reset ESP32Cam, wait a few seconds.



Case A:

ESP32 WiFi is ready to be connected. you can go to the next step.

Case B:

The camera has a tiny connector and you must ensure it's connected in the the right way and with a secure fit, otherwise it will fail to establish a connection. After correcting the error, restart the ESP32. If case A occurs, the ESP3 WiFi has entered the connection-ready state, and go to the next step.

Case C:

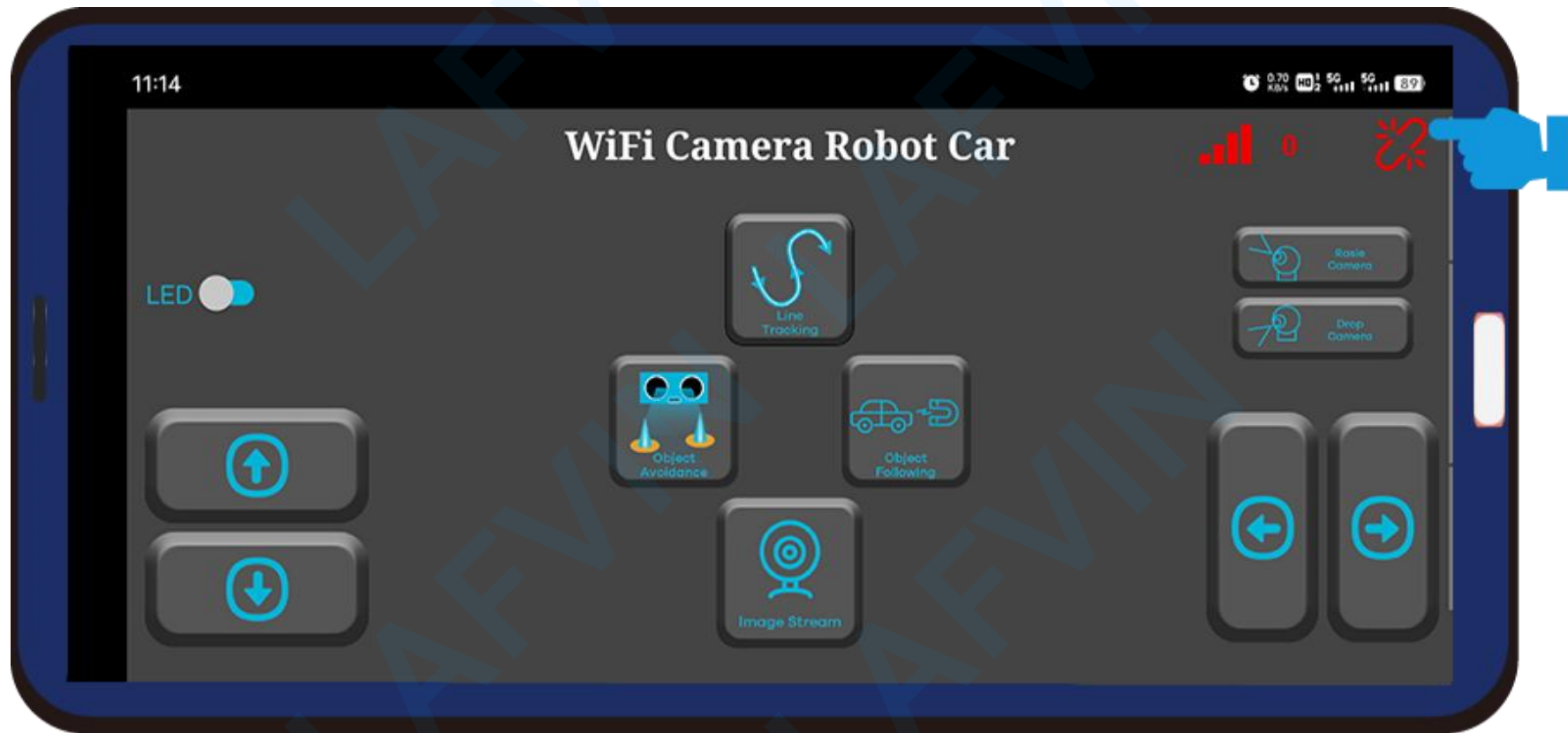
Check whether the power supply is sufficient, and the recommended power supply voltage is $>7.6V$. After correcting the error, restart the ESP32. If case A occurs, the ESP3 WiFi has entered the connection-ready state, and go to the next step.

④ Go to your phone's wifi settings, search for and connect to a device whose name contains "esp32cam-xxxx".



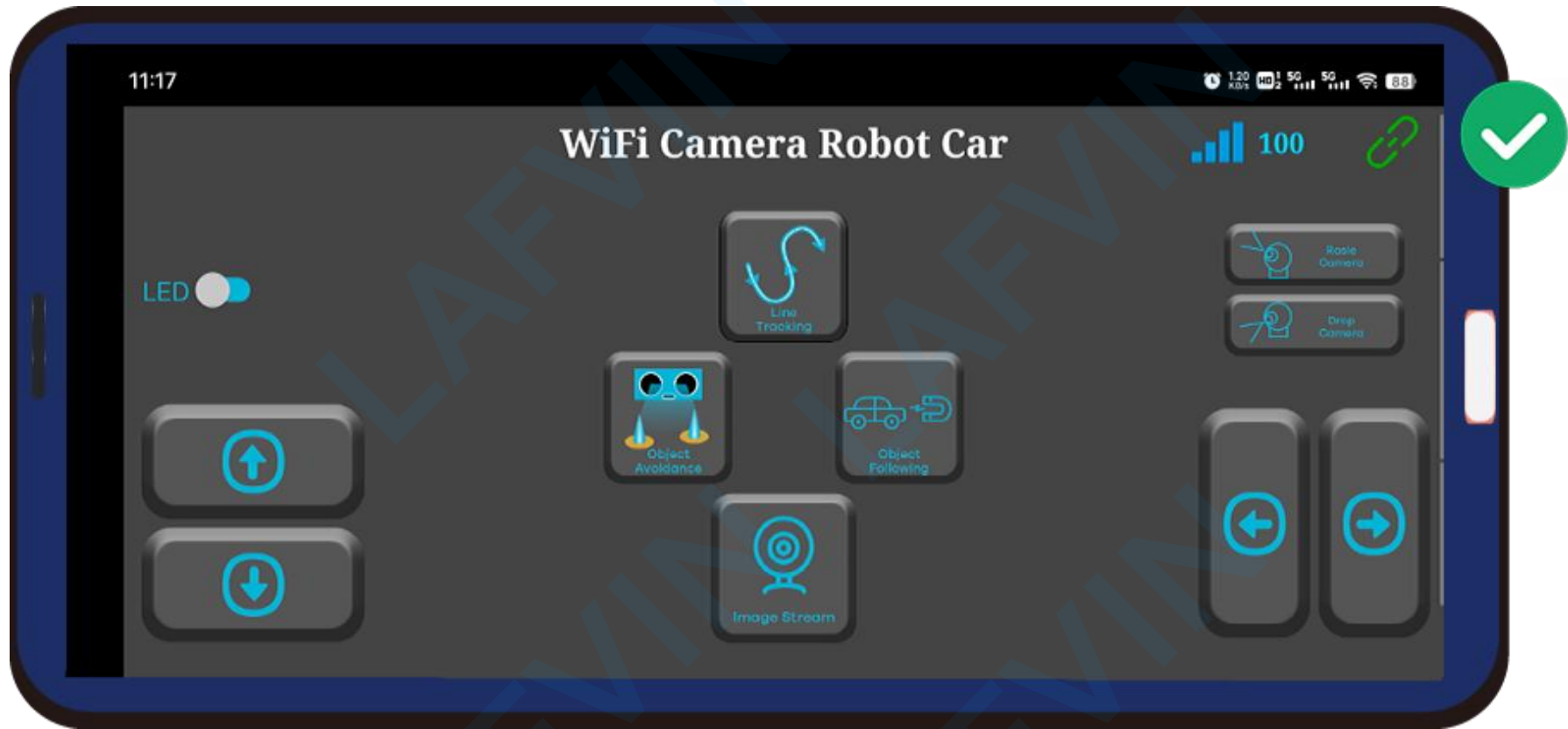
LAFVIN

⑤ Open the APP remote control, click the  button to match the esp wifi device.



LAFVIN

After a successful match, an icon  will appear in the upper right corner.



Note: The reason for the matching failure may be that your mobile phone is not connected to any WiFi device or connected to a WiFi device whose name does not contain esp32cam-xxxx.

LAFVIN

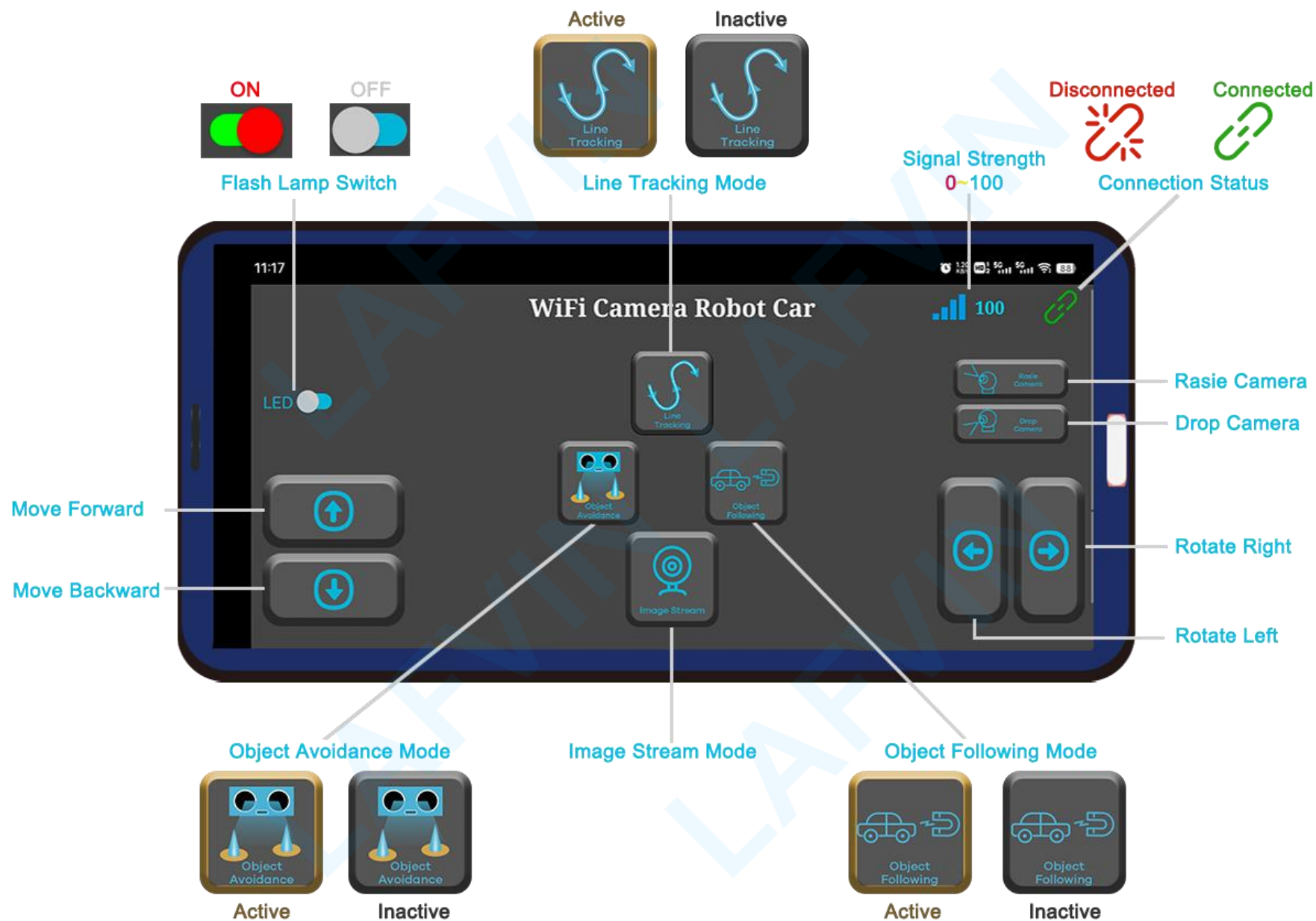
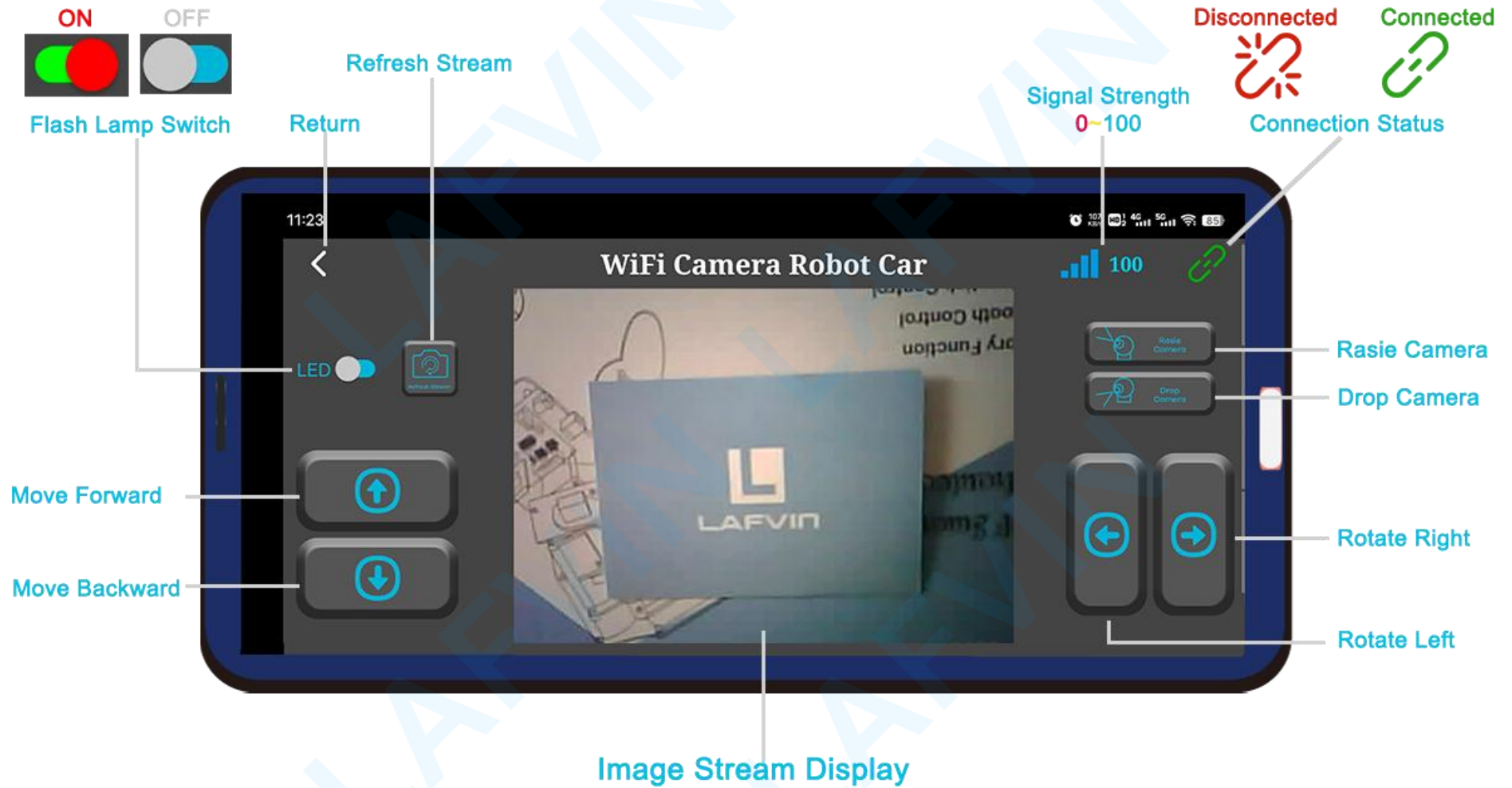


Image Stream Mode





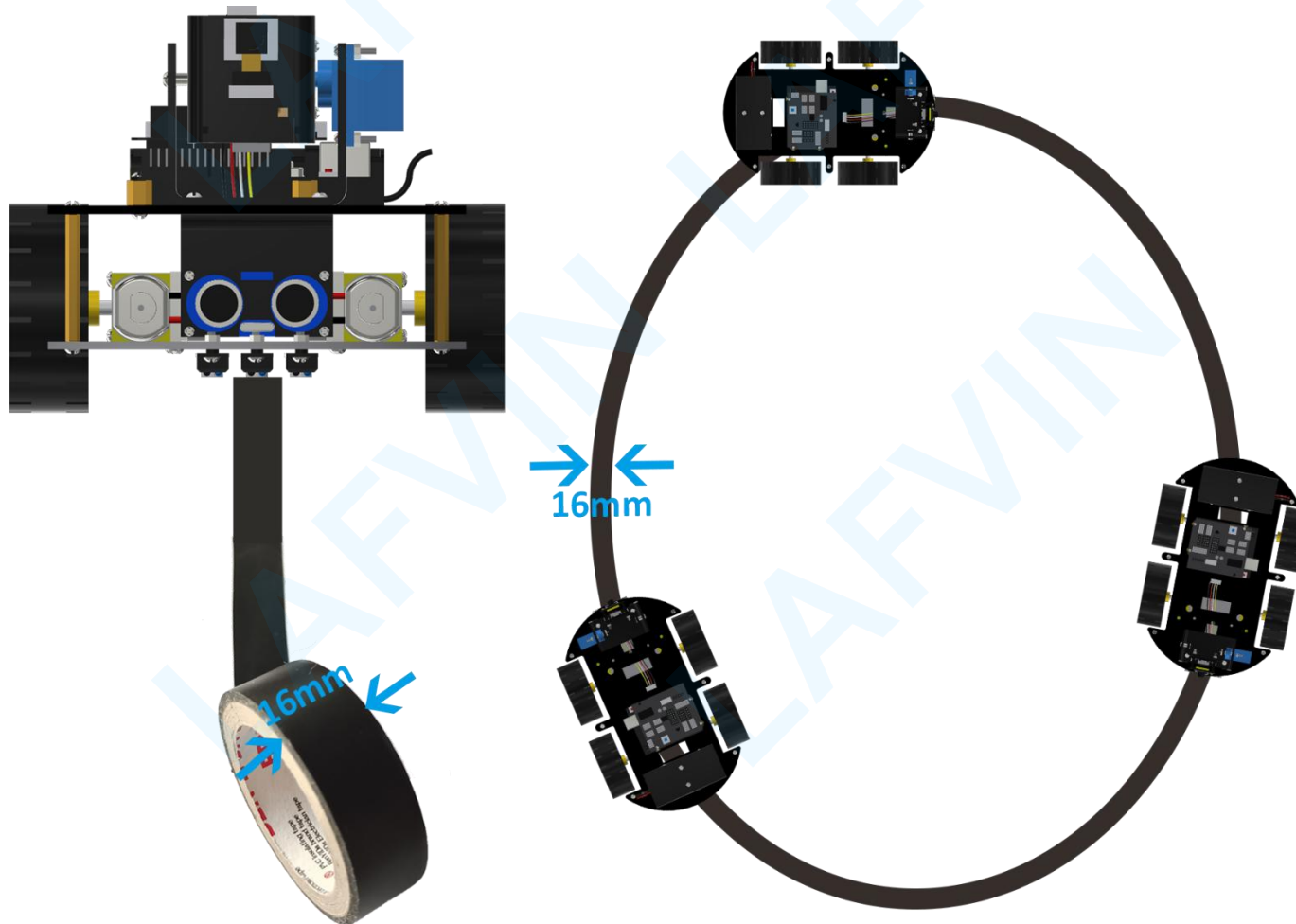
Tips: When signal strength is poor. The video resolution has been automatically reduced.

1. Keep power supply voltage $>7.6V$;
2. Use external antenna;
3. The transmission distance is too far, please shorten transmission distance;
4. Try to avoid obstacles on the signal transmission route such as walls and metal doors

If the connection is interrupted suddenly, the screen may freeze or the control action command cannot be executed. You need to reset the ESP32Cam and re-establish the connection.

Line-Tracking Mode

Put the car on the manual track first. When the  key of the APP remote control is pressed, the car will activate the line-tracking mode. In this mode, the car will drive along the track. When pressing the  key of the APP remote control or other keys, it will exit the line-tracking mode.



Not working perfectly?

① First check if the wiring of the line-tracing sensor is correct?

S(Left)-->D7 S(center)-->D8 S(right)-->D9

② Then check Status LED Lights



Each sensor should work normally as follows:

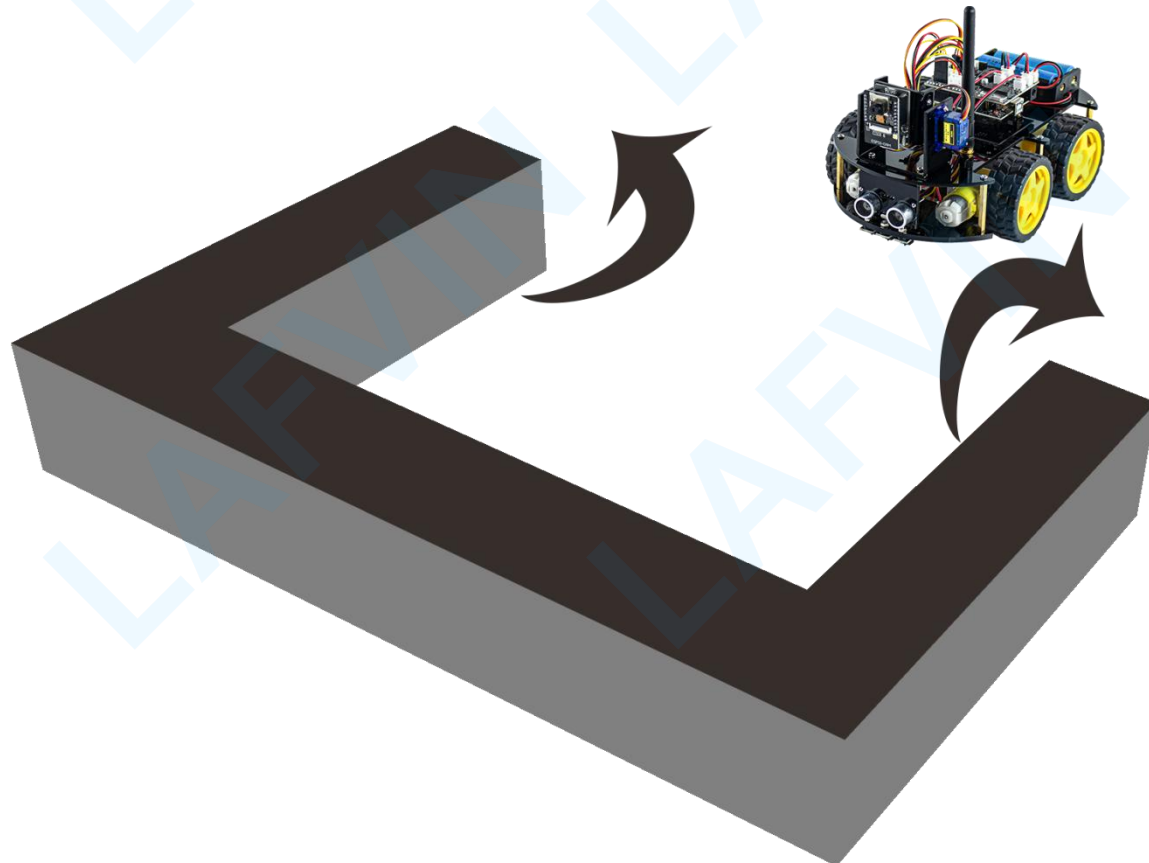
white detected-->Status LED ON Black detected-->Status LED OFF

③ Finally adjust the sensitivity



Since the sensors on the line-tracking module are greatly affected by the environment, if the car does not work well under the line-tracking module, you can use the potentiometer to adjust the sensor thresholds so that it can enable the car to operate at its optimum level.

Object-Avoidance Mode

The car will enter the object-avoidance mode when pressing  key of the APP remote control. The car will move forward automatically until encountering obstacles. And it will automatically turn to the direction without obstacles to continue moving forwards when encountering obstacles. When pressing the  key of the APP remote control or other keys, it will exit the object-avoidance mode. **Tip: If the detection distance is wrong, try to restart the power.**



Object-Following Mode

The car will enter the object-following mode when pressing  key of the APP remote control. If there are obstacles in the 20 CM ahead of the Ultrasonic Sensor Module, the car will automatically move following the obstacle. When pressing the  key of the APP remote control or other keys, it will exit the object-avoidance mode. **Tip: If the detection distance is wrong, try to restart the power.**



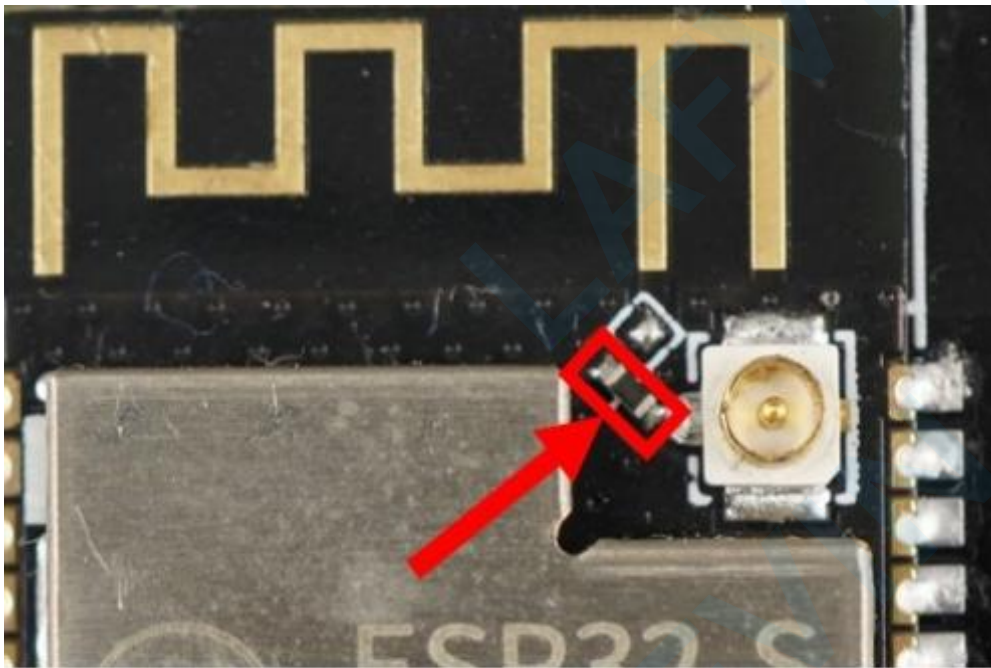
External Antenna and On-Board Antenna

Tip: It has been configured as an external antenna before factory, just install an external antenna on the IPEX connector. If not, you can refer to the following ways to configure.

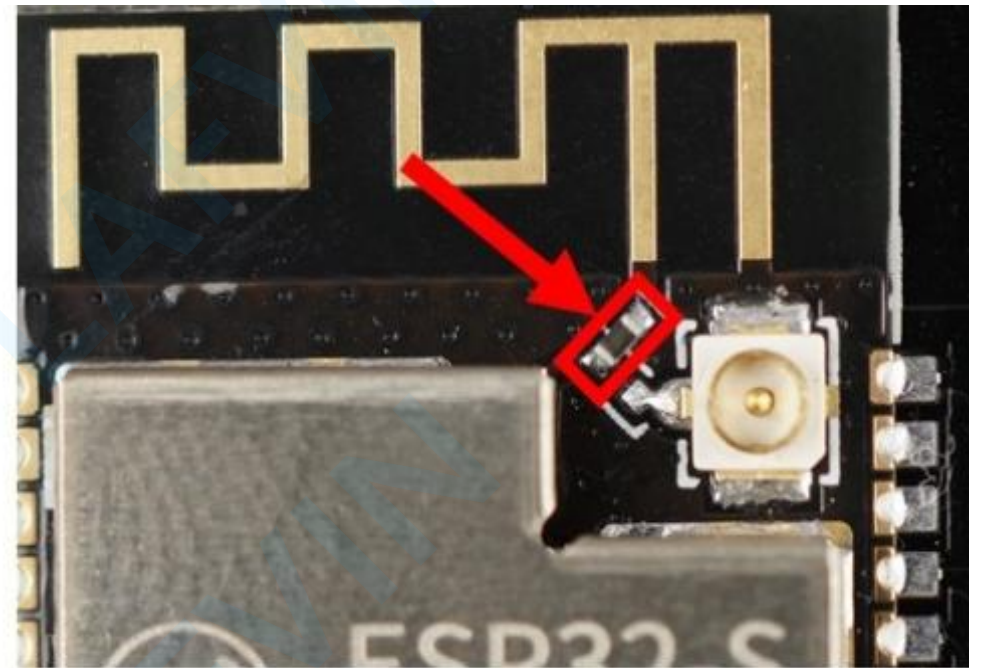


LAFVIN

Normally, projects with video streaming crash frequently when you don't use an external antenna due to poor connectivity. So, using an external antenna can reduce crashes in video streaming projects.



External Antenna



On-board Antenna

Next to the IPEX connector there are three little white squares laid out like a “<” with the middle position being common. There is a resistor selecting the desired antenna. Here’s the two configurations:

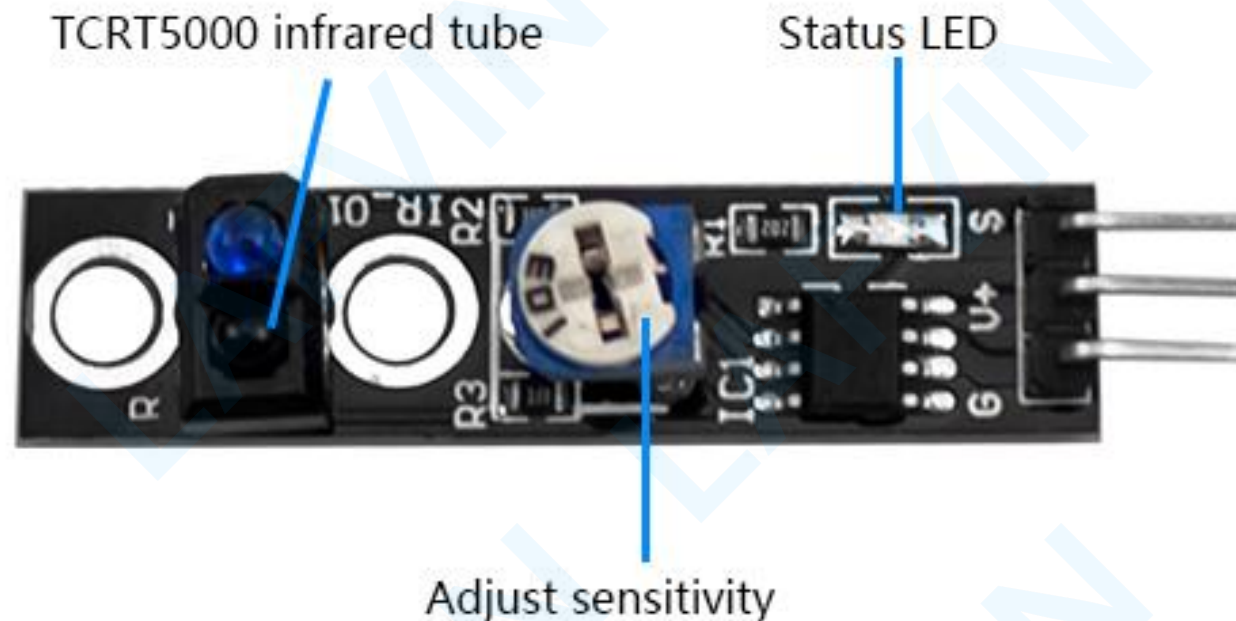
① To use the IPEX connector with an external antenna, the resistor must be on the bottom position, like this “\”. See illustration below;

② To use the PCB antenna (on-board antenna), the resistor must be on the top position, like this “/”.

To enable or disable the on-board antenna, you just need to unsolder that resistor and solder it in the desired configuration. You can also drop some solder to connect those points (you don’t necessarily need to add the resistor as long as the pads are connected).

Note: You can’t use the two antennas at the same time, so you can only have one connection for the antenna.

Line Tracking Sensor

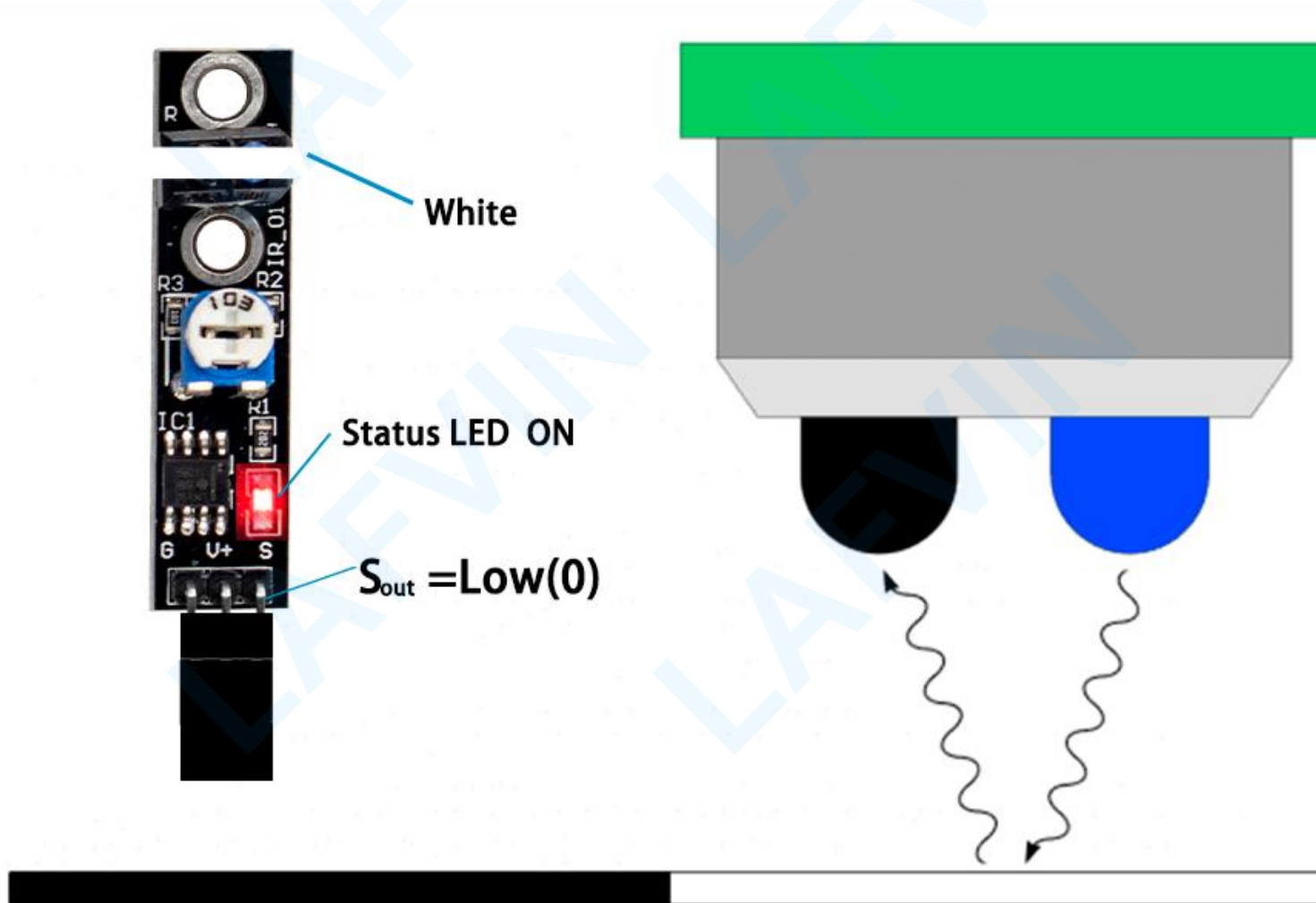


Line Tracking Sensor has three pins – one for ground (G), one for Vcc (V+), and one for the signal output (S). The blue LED is the IR transmitting LED, and the black LED is the IR receiving LED. Line Tracking Sensor has a range from 0.5 cm to 1.5 cm.

The IC on the board is an LM393 comparator, which converts the analog signal from the receiving LED into a digital signal that is sent to the sensor's signal output pin.

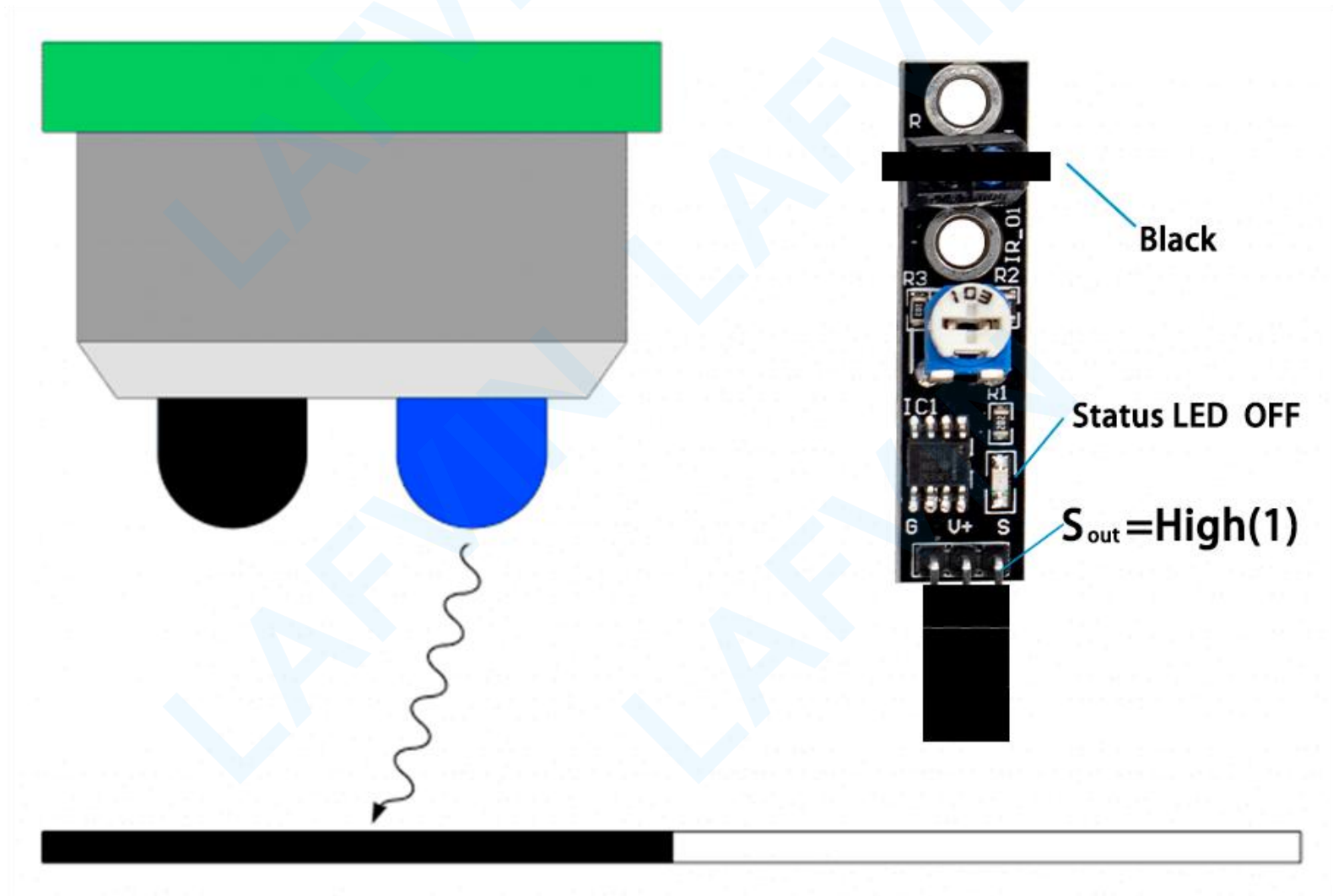
How Tracking Sensors Work

White surfaces reflect IR light and dark surfaces absorb IR light. When the tracking sensor is placed over a white surface, the IR light is reflected off of the surface. The reflected IR light is detected by the receiving LED.



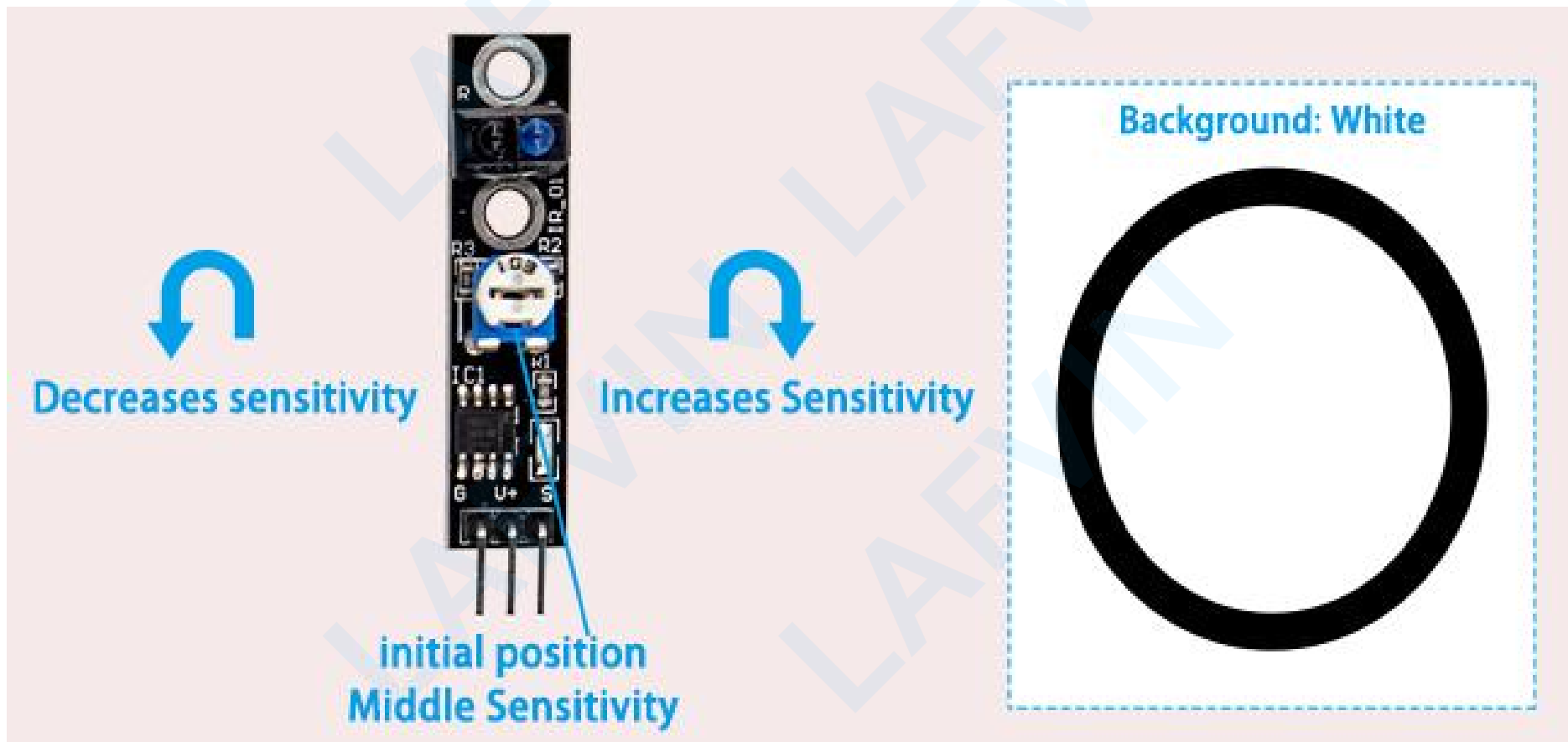
LAFVIN

But if the tracking sensor is placed over a darkly colored surface, the IR light gets absorbed by the surface. So the receiving LED won't detect any IR light.



Adjust sensitivity

The initial position of the potentiometer is medium sensitivity, and the black line can achieve the best effect on the white background. If the background color is not white, you may need to increase the sensitivity for better results.



Arduino Motor Driver Shield

Motor Driver

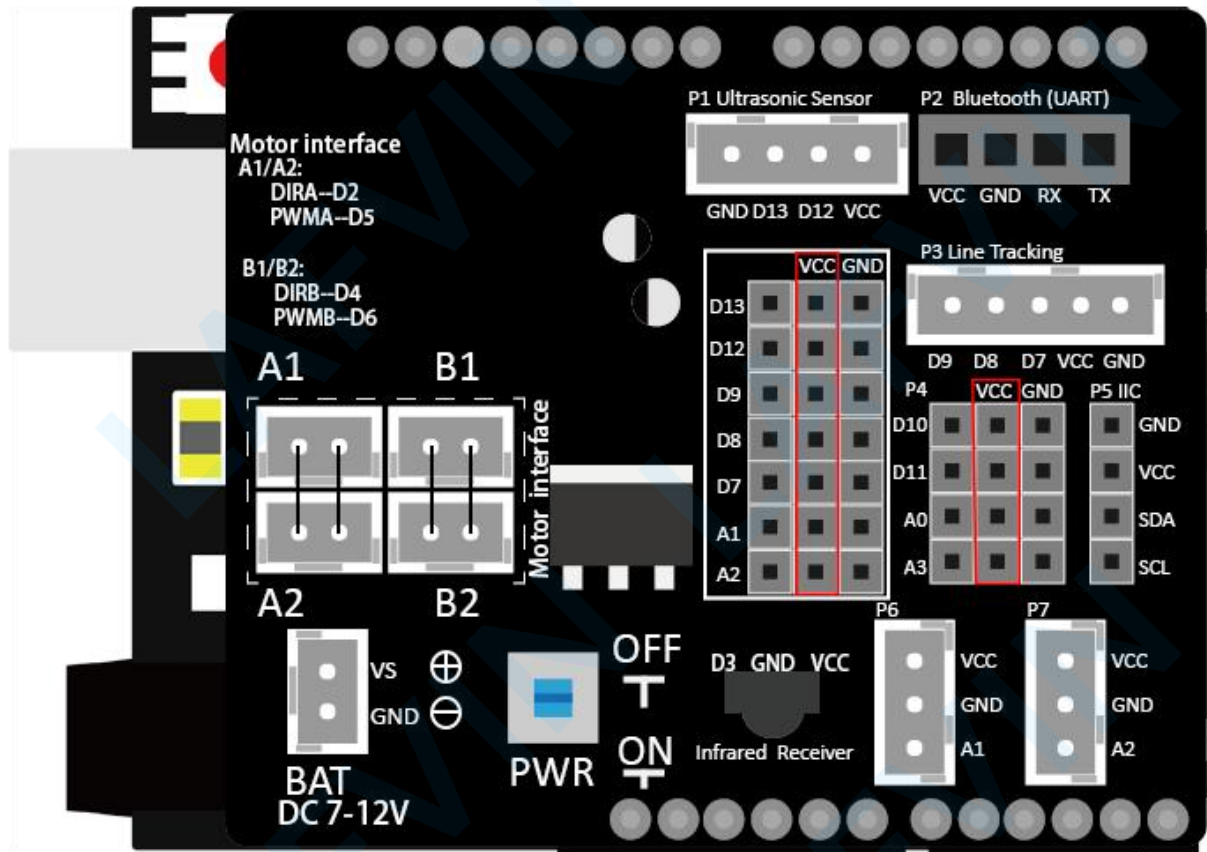
The expansion board has integrated the motor drive chip L298HN. Current motor drive device, which has a large current MOSFET-H bridge junction Structure, dual-channel circuit output, can drive 2 motors at the same time. It outputs continuous drive power up to 1 A per channel Current, starting peak current up to 2A/3A (continuous pulse/single pulse (Punch)); 4 motor control modes: forward/reverse/brake/stop End;

Specifications:

Recommended motor voltage (VMOT): 7.4– 13.5 V

- Logic voltage (VCC): 2.7 – 5.5 V
- Output current maximum: 3 A per channel
- Output current continuous: 1 A per channel (can be paralleled to deliver 2 A continuous)

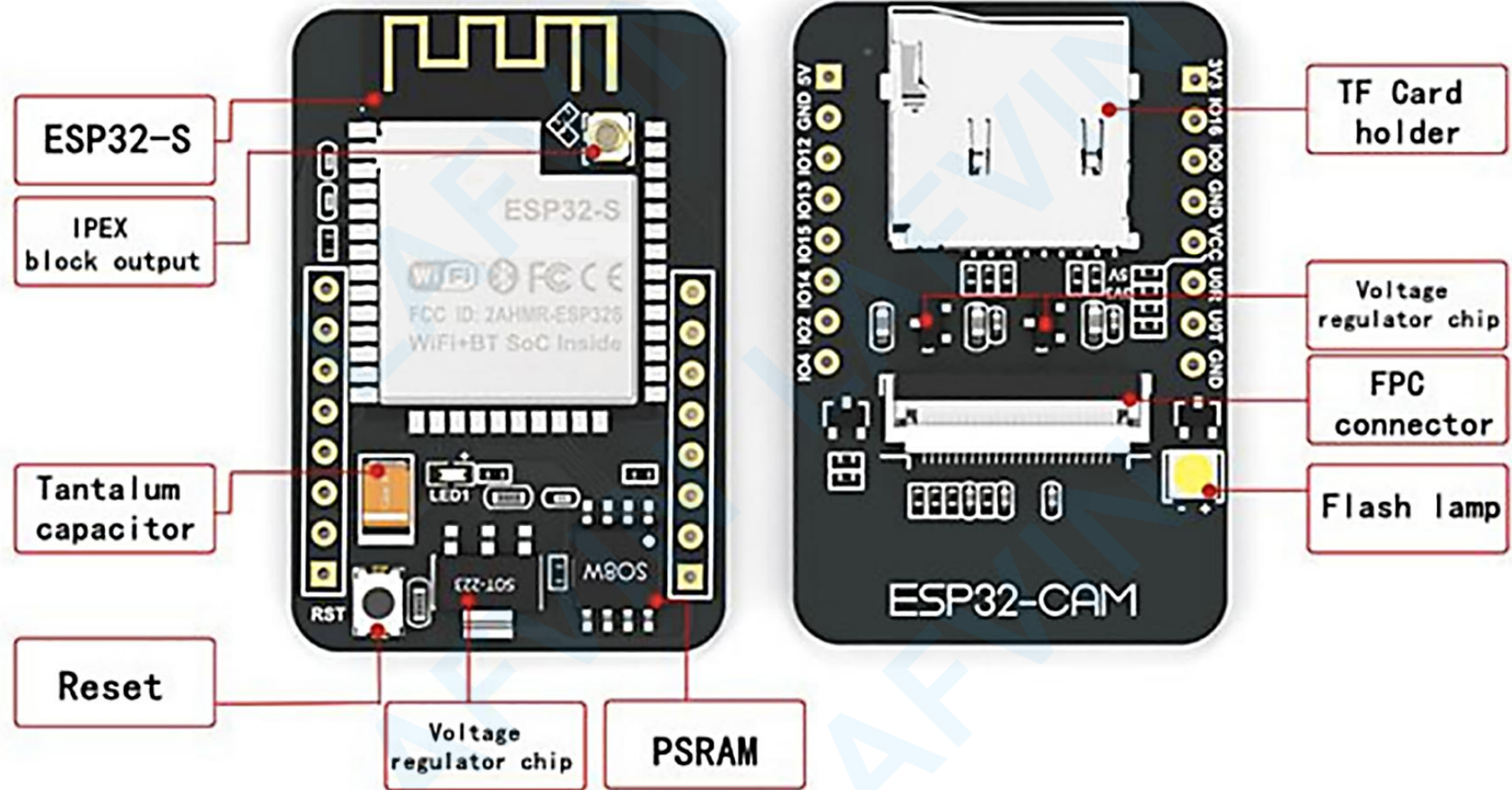
LAFVIN



The PWM value is in the range of 0-255. The greater the value, the faster the motors turn. When PWM=0, it means stop, when PWM=255 it means maximum speed.

| Arduino PIN Status | D2 | D5(PWM) | D4 | D6(PWM) |
|-----------------------|------|---------|------|---------|
| Forward | HIGH | 0-255 | LOW | 0-255 |
| Backward | LOW | 0-255 | HIGH | 0-255 |
| Rotate to left | LOW | 0-255 | LOW | 0-255 |
| Rotate to right | HIGH | 0-255 | HIGH | 0-255 |
| Stop | / | 0 | / | 0 |

ESP32Cam



LAFVIN

