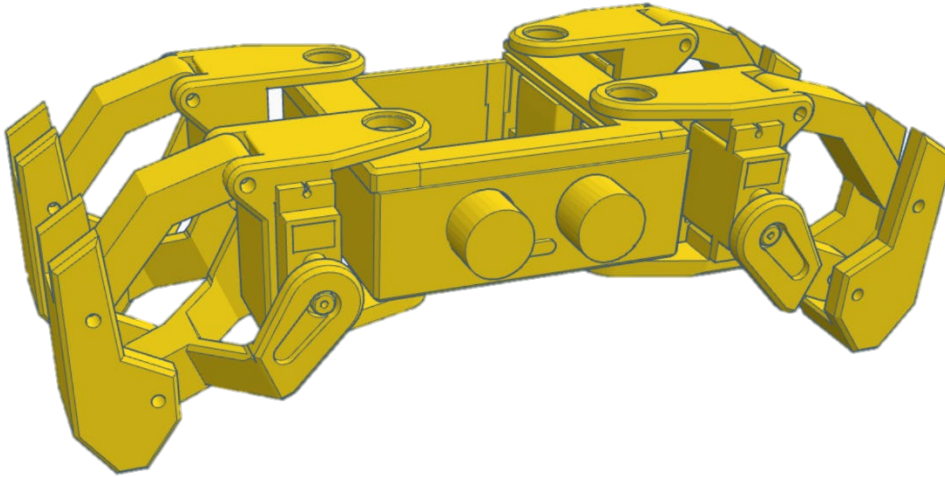


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KAME-ESP(ESP8266/ESP32)

Ahmad Hanis Mohd Shabli



Introduction

Kame-ESP is a quadruped robot that use to promote STEM learning among youngster. It is based on Javier Mini Kame project (<https://github.com/JavierIH/miniKame>) that had been enhanced and modified to provide better learning experience. It uses 3D printed part, electronics component such as servo, PCB, microcontroller and screws to build one. The robot run using modified firmware installed in NodeMCU 1.0 (ESP8266) or ESP32 Dev which widely available. To control the robot, a mobile application has been developed incorporating basic movement (forward, left, and right) and other advanced movement such as dancing, punch, hello and etc.

Disclaimer

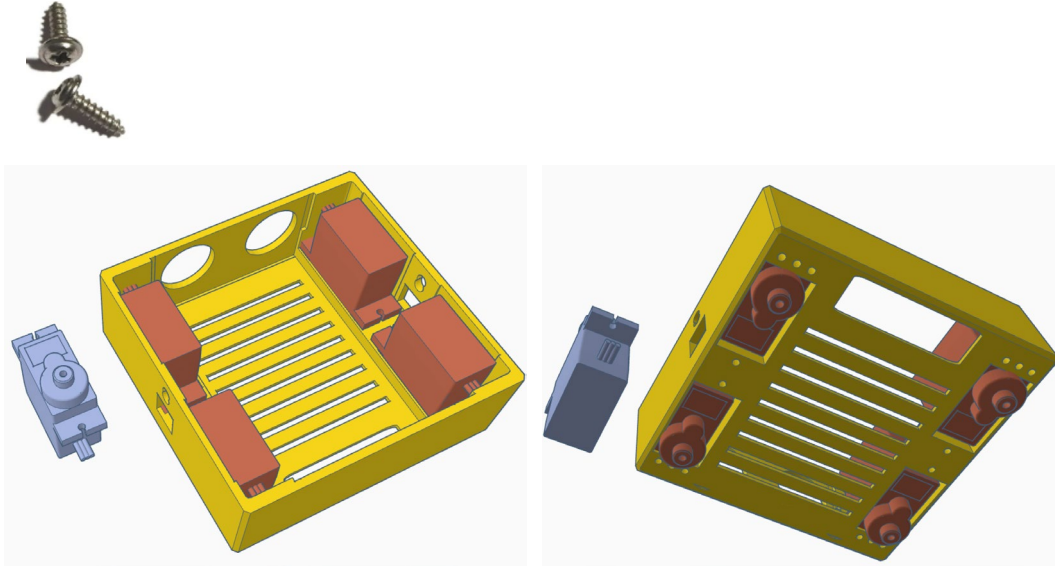
Please read and agree to the following disclaimer.

- Not suitable for ages below 10 years old.
- Material is 3D printed and might not the highest of quality. The printed material print using the average print setting and due to various other factors, it may result in inconsistent print output.
- The battery use is Lithium Polymer battery which is know to have unstable element. Please treat the battery carefully and disconnect battery when not in use. Do not puncture and store the battery in room temperature. Do not overcharge or over discharge. Dispose the battery if the battery shows physical change.
- Please follow the assembly guideline carefully and handle all item with care due to its 3D printed nature.

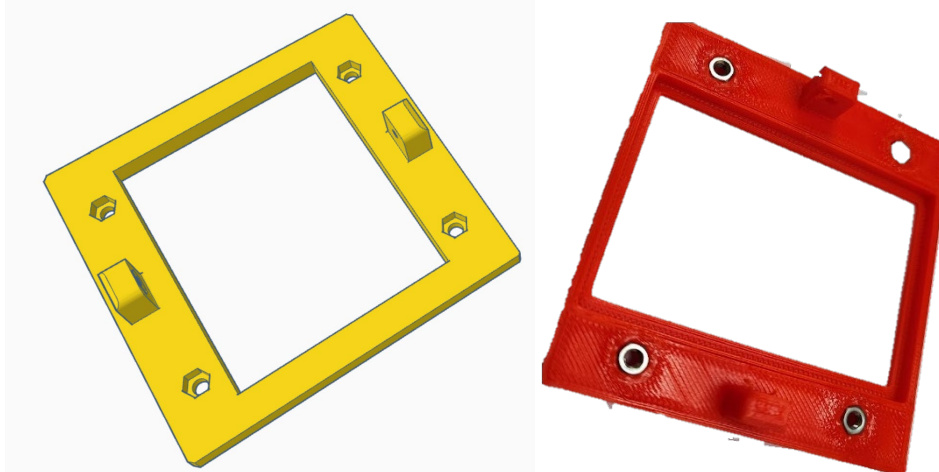
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KAME-ESP ASSEMBLY MANUAL

1. Pickup Kame body part and insert 4 servos into servo slots. Make sure servo orientation is correct where the servo mount is on the outside. Use the 2 longer self-tapping screws for each servo to attach to the body.

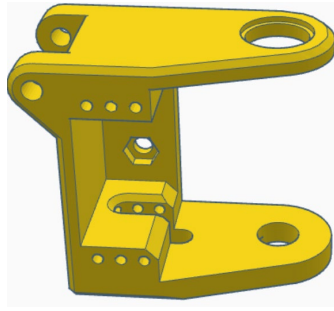


2. Insert four nuts into the bottom top section of the body. Use heat gun where necessary to properly push the nut into all four slots.

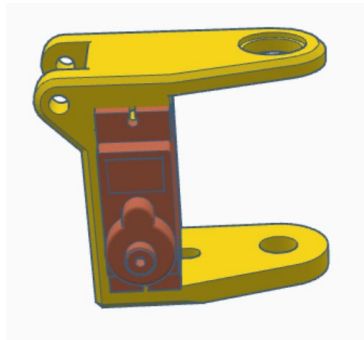


3. There are for legs for KAME which consist of shoulder, connector, Y-section, and foot. Pickup shoulder section and insert nut into nut slot. Use heat gun where required.

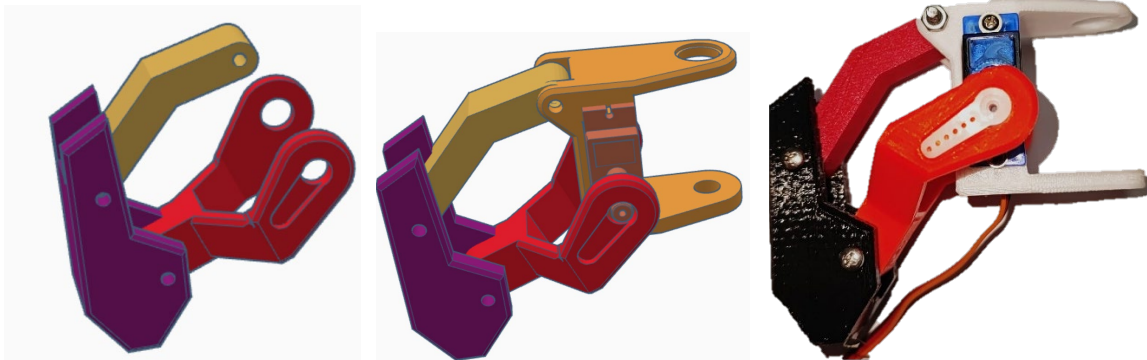
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4. Insert servo into servo slot into shoulder block and screw in using the servo self-tapped screws.

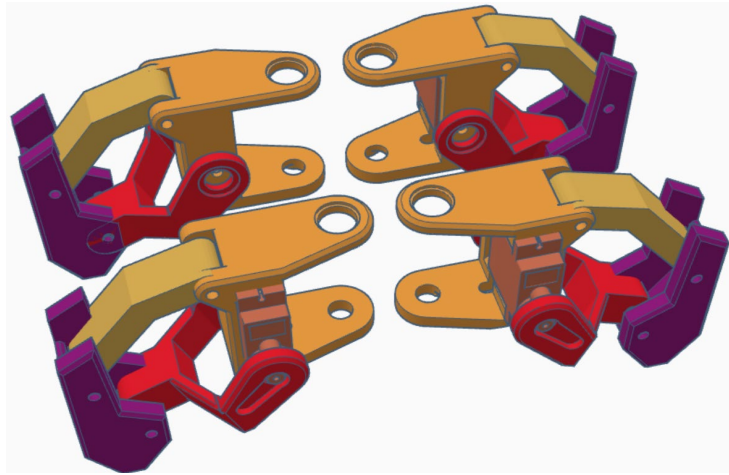


5. Take connector (dark yellow), Y section (red) and foot (purple) and then assemble as follows. Make sure the servo orientation matches the shoulder servo facing section. Use 2 M3x30mm screws with nuts for the installation.

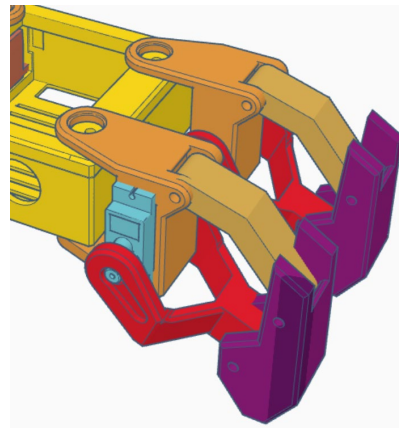
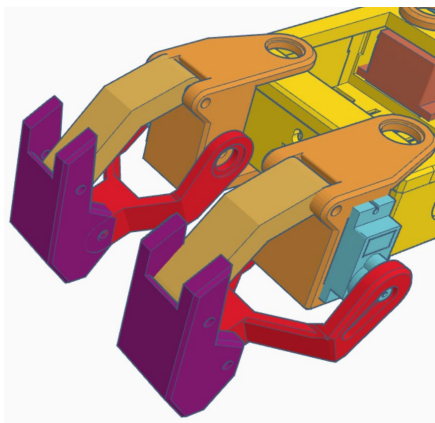
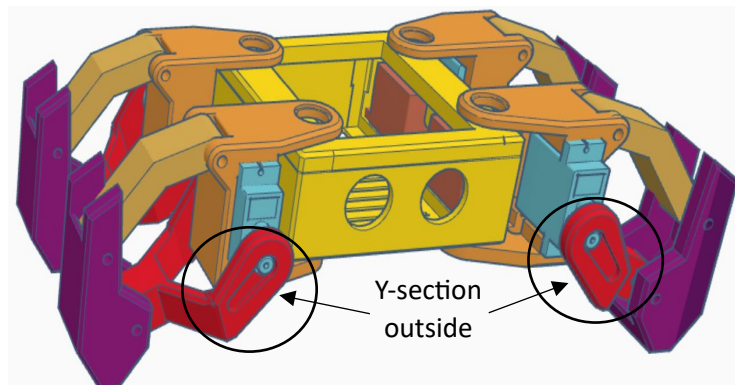
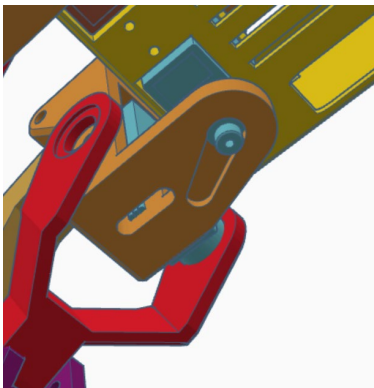


6. Repeat step 4 and 5 to complete with all 3 legs. Please noted on the orientation of the legs. There are pairs. Do not attach servo horns to the horn section yet! Take your time to check on the orientation for each leg. Use 4 M3x10 screws for all Y-sections assembly with faux plastic bearing.

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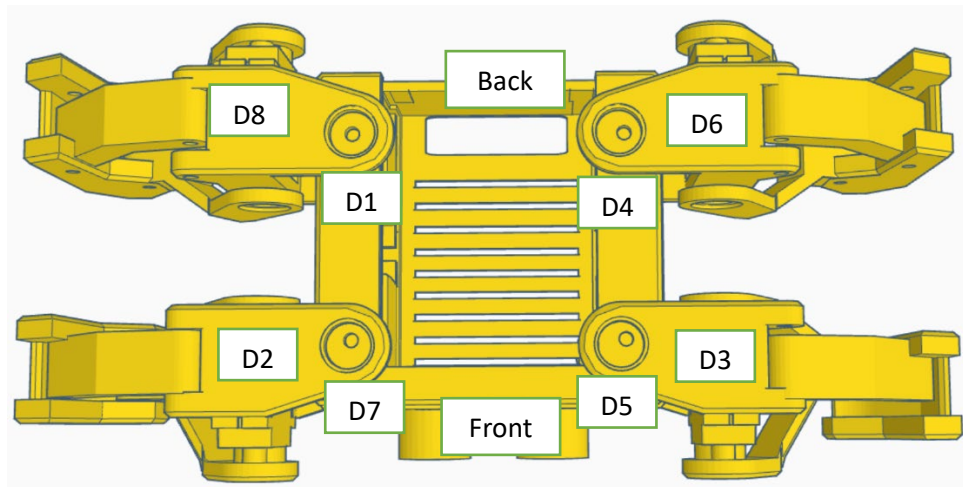
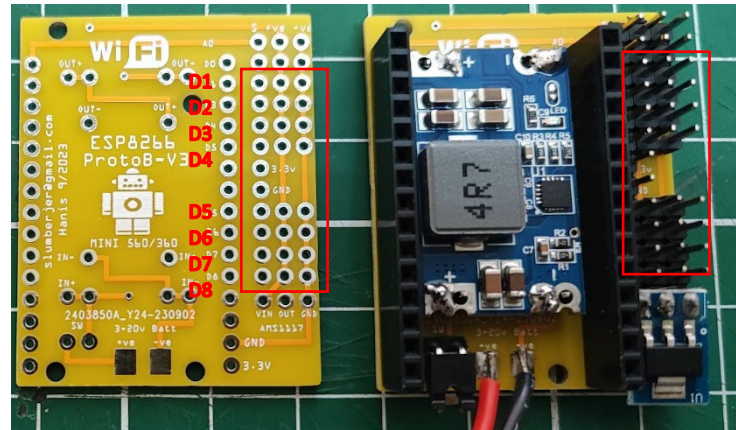
7. Attach all legs to the body section with bottom shoulder slot into servo arm mount (don't force and be careful not to break). Check again each leg section orientation. The protruded Y-section part (red) should be on the outside. Use 4 M3x10 screws to attach to faux plastic bearing to lock the shoulder section to the top body.



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8. Route all legs servo wires inside the body through square hole on the side of the body section and out to the top.
9. Insert NodeMCU ESP8266 PCB board into the body and use the following diagram to attach each servo cable to the servo male slot available on the PCB. The pin start from number 3 slot from the top for D1 and continue with D2, D3, D4, D5, D6 and D7.

ESP8266 NodeMCU

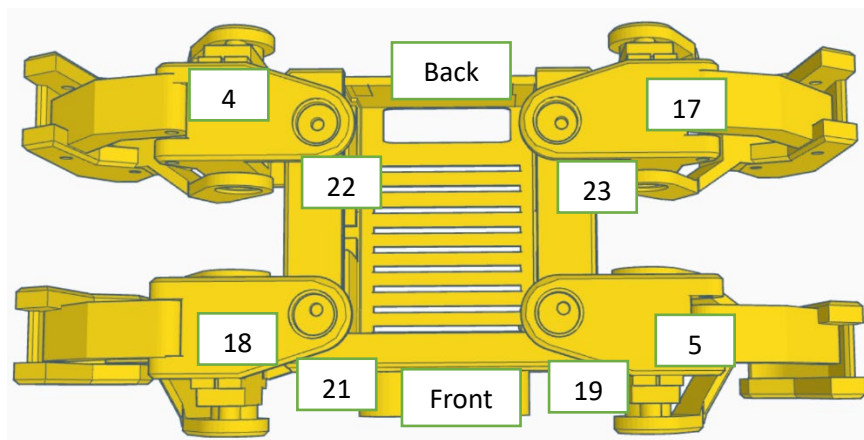
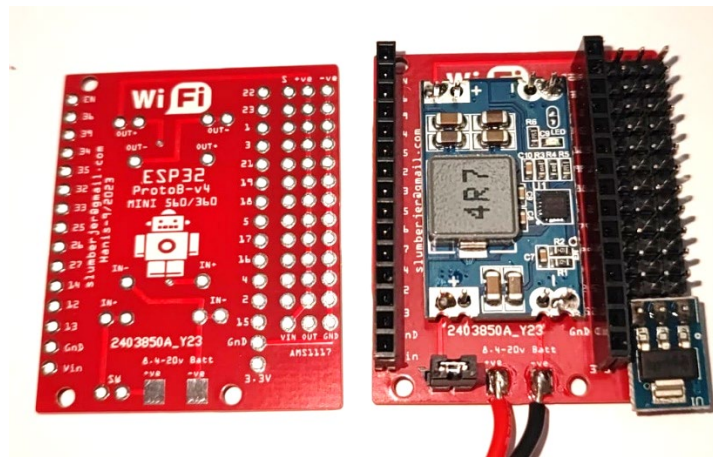


Use the above diagram to guide each servo to their slots. Servo wires consist of signal (yellow/white), positive (red) and negative (black) wires. The orientation of the where the black wires is on the outside of the PCB.



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10. ESP32 PCB board will require different servo configuration wiring as follows.



Once the wiring process completed continue with APP installation on your Android device.

11. Install Kame Controller Android app on your phone download from the following link <https://slumberjer.com/android/kame.apk> or by scanning the QR code provided. However, you will be needed to allow for your device to allow external app installation option to turn on to be able to install the app. Run the app and allow all the requested permissions.

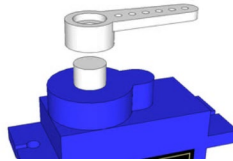


12. The following steps are very important to follow where Kame will be reset its servo default position to install all its servo horn. Connect the power cable to a

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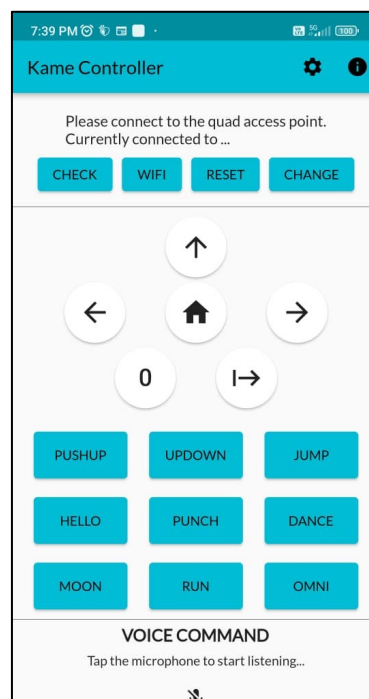
LiPo battery and wait for 3 seconds. Wait for all servos to reset its position and quickly disconnect the battery. **All servo's will automatically reset to their starting point within 3 seconds.** Don't wait until the second servo positioning for homing position.

Disconnect the battery and insert all servo horns to all 8 servos. At this point **do not move the servo gear by rotating when attaching the servo horn or the reset process will be required to repeat.** Lock the servo with servo screws.



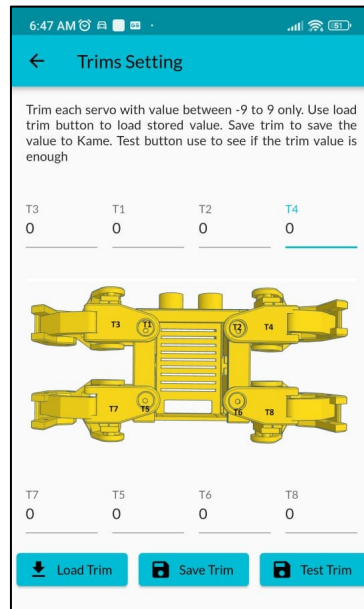
Make sure the reset position is as the picture above where **all arms perpendicular to the body.** Try to get the best position of the servo horn and if any small misalignment happen that can be corrected later in the mobile app trim setup screen.

13. Reconnect the battery and connect to the Kame hotspot. Try each of the buttons to check if Kame properly responds to the command. If any of the command shows weird movement, try the troubleshoot list at the bottom.



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14. If any trim required for your Kame, please access your Trim menu from the setting button from your Kame Controller AppBar. Start by press the load trim button to load the stored trim value for each servo. Each of the input correspond to the servo label in the picture. Try to insert value between -9 to 9 for any of the servo that required to be adjusted. Use Test Trim button to check if the value correctly set. Press the Save Trim button to store the trim values.



Troubleshoot

1. If Kame did not respond to command check your Wi-Fi connection. Your Android should connect to Kame access point and disable your mobile data option.
2. If command button press did not correctly show its intended action, please check your servo wiring again. It is highly possible that servo did not place in their required position.
3. If Kame is working and suddenly shows weird response when a command is given, check battery voltage. Kame can be run for 5 minutes and then it will require battery recharge.