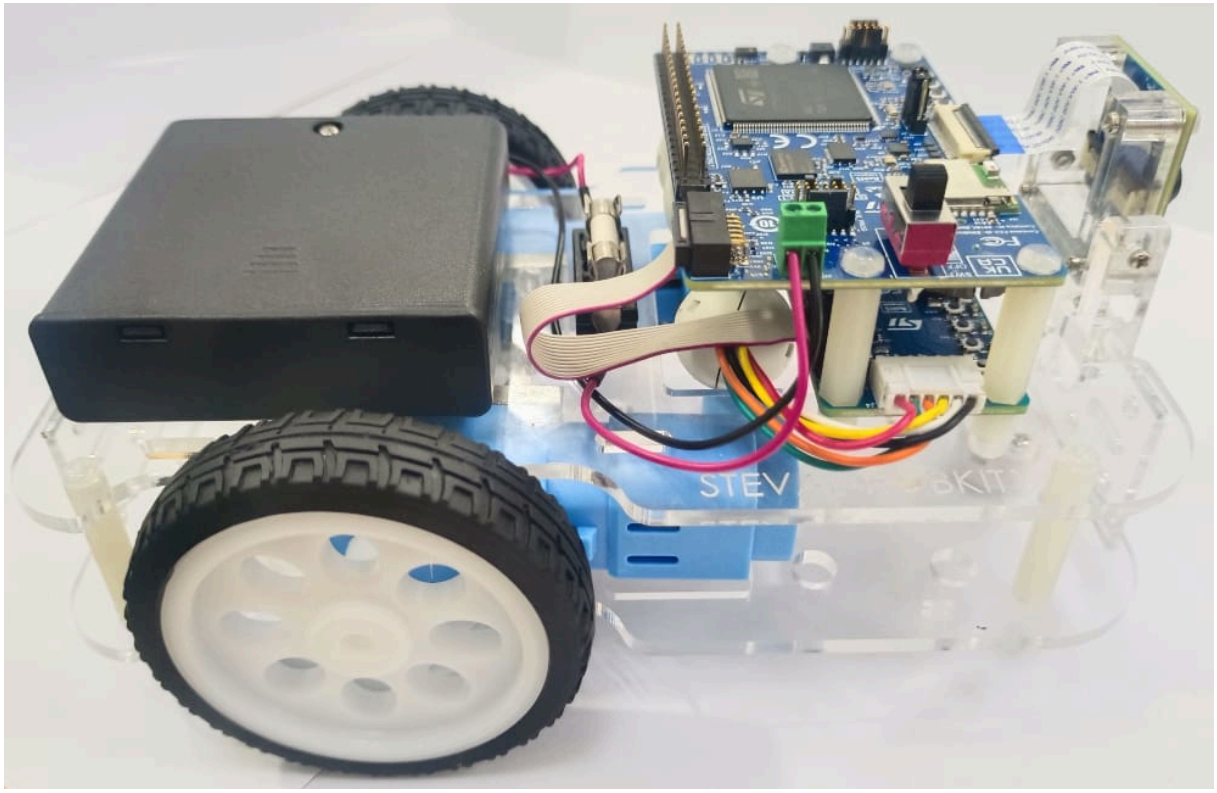
Assembly instructions for STEVAL-ROBKIT1 robotics evaluation kit

Introduction

This guide will walk you through the essential steps to assemble the robotics evaluation kit and have it ready for full operation. Some basic tools like small screw drivers and tweezers are required to complete the assembly.

Figure 1. Fully assembled STEVAL-ROBKIT1 robotics evaluation kit



*Notice: For dedicated assistance, submit a request through our online support portal at **www.st.com/support**.*

1 Getting started

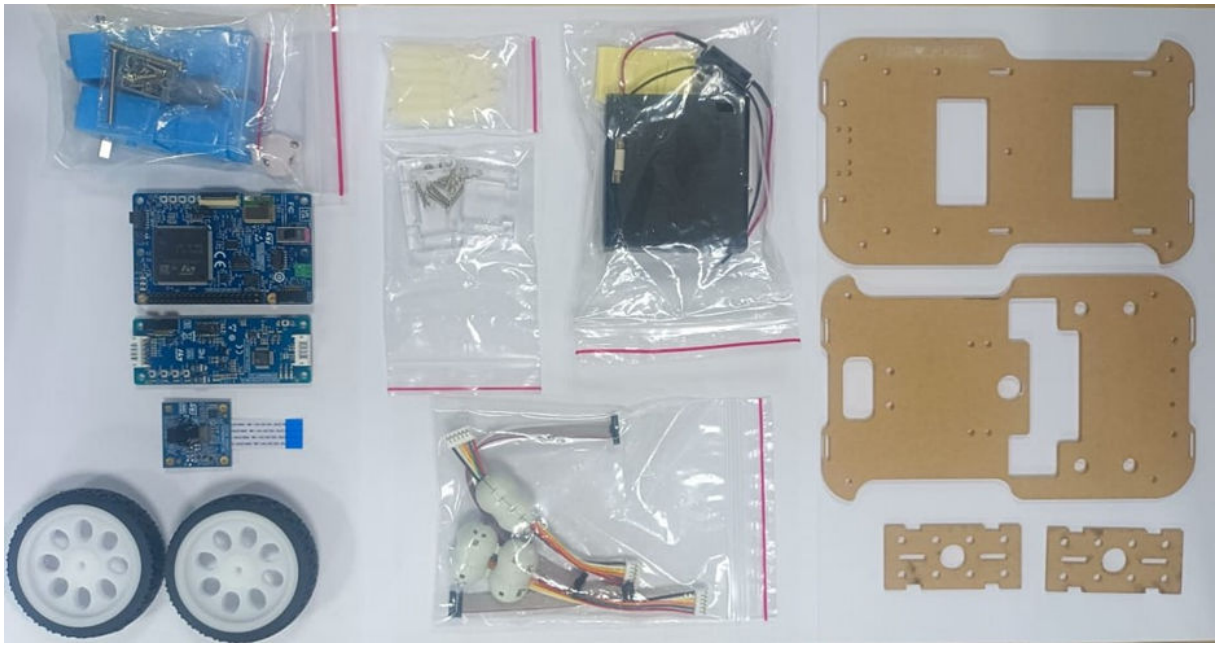
This section provides the contents of the STEVAL-ROBKIT1 robotics evaluation kit:

Table 1. Contents of STEVAL-ROBKIT1

Item	Qty	Reference	Manufacturer	Manufacturer part number
1	1	STEVAL-ROBKIT1-1	STMicroelectronics	STEVAL-ROBKIT1-1
2	1	STEVAL-ROBKIT1-2	STMicroelectronics	STEVAL-ROBKIT1-2
3	1	STEVAL-ROBKIT1-3	STMicroelectronics	STEVAL-ROBKIT1-3
4	1	Acrylic frame (as per provided design 3 mm transparent sheet)	-	-
5	2	6V/150RPM TT DC motor with encoder	-	-
6	2	6 pin motor cable	-	-
7	2	TT motor 65 mm wheel	-	-
8	1	Castor wheel with two screws to mount on bottom frame	-	-
9	1	Battery holder case	-	-
10	4	1.5 V AA non-rechargeable batteries	-	-
11	1	12 pin cable to connect STEVAL-ROBKIT1-1 with STEVAL-ROBKIT1-2	Samtec	FFSD-06-D-03.00-01-N
12	1	26 pin FFC cable to connect STEVAL-ROBKIT1-1 with STEVAL-ROBKIT1-3	Wurth	687626050002
13	1	Additional 14 position cable for ST-LINK connection	Samtec	FFSD-07-D-05.90-01-N
14	8	Female-female hex standoff: 4 x hex standoff between STEVAL-ROBKIT1-1 and STEVAL-ROBKIT1-2; 4x hex standoff between frame top and frame bottom part	Harwin-Inc	R30-1612500R30-1612500
15	4	Male-Female hex standoff: 4x between STEVAL-ROBKIT1-2 and acrylic frame	Essentra	36M30MF006
16	16	M3 screws: 4 at STEVAL-ROBKIT1-1 board top; 4 at STEVAL-ROBKIT1-2 bottom; 8 for frame	Wurth	97790803111
17	2	Motor bracket holder mount consists of a motor mount + 2 long screws + 2 short screws + 2 nuts) for each motor	-	-
18	6	Hex bolt: 8 x for camera mount assembly	Essentra	50M030050J020
19	6	Hex nut: 8 x for bolts used in camera mount assembly	Essentra	04M030050HN
20	2	Terminal Wire between J4 of STEVAL-ROBKIT1-1 to battery holder case	N.A.	N.A.
21	1	Fuse Holder	Littelfuse	64700001003
22	1	Fuse	Littelfuse	0477001.MXP
23	2	Ferrite clamp (on cores STAR-BUENO Snap 25 MHz 125 Ω)	Wurth Elektronik	74275812

Figure 2. **STEVAL-ROBKIT1 kit box**

Figure 3. **STEVAL-ROBKIT1 kit box contents**



2 Assembly instructions

This section provides detailed instructions to help you assemble the STEVAL-ROBKIT1 Robotics Evaluation Kit. Follow each step carefully to ensure correct installation of both hardware and connections. Before you begin, make sure to work on a clean surface and handle electronic components with care to avoid static damage.

Accessories needed for assembly:

- Small screwdriver for M3 cross and flat shape
- Tweezers used for SMD components

2.1 Mount castor wheel on frame

Step 1. Remove protective film of the frame, and locate the castor wheel with two screws to mount on the bottom side of the frame.

Step 2. Position the castor wheel on the designated mounting area at the bottom of the acrylic frame, ensuring the wheel rotates freely and is oriented to allow movement in all directions.

Step 3. Align the screw holes on the castor wheel with the corresponding holes on the frame.

Figure 4. Screwing castor wheel on the frame

2.2 Mount standoff and M3 screws on bottom frame

Step 1. Collect the four female-female standoffs and corresponding M3 mounting screws provided in the kit.

Step 2. Identify the locations on the base of the acrylic frame where the female-female standoffs are attached.

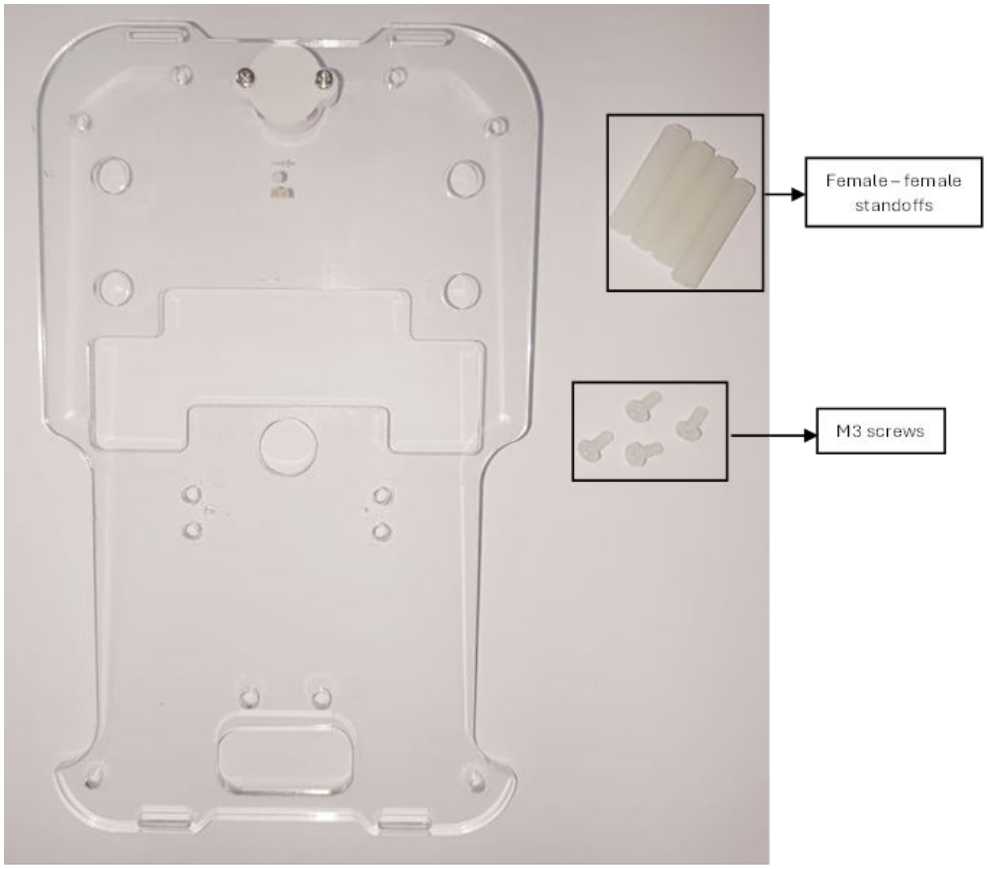
Step 3. Take one M3 screw and position it on the bottom side of the frame, aligned with the first standoff hole.

Step 4. Apply firm pressure and push the M3 screw up through the frame hole.

Step 5. Thread a female-female standoff onto the protruding screw (M3) from the top side of the frame, twisting clockwise until it is hand tight.

Step 6. Repeat the process for the remaining three screws(M3) and female-female standoffs, ensuring each is securely fastened to the frame.

Figure 5. Bottom frame, standoffs, and mounting screws

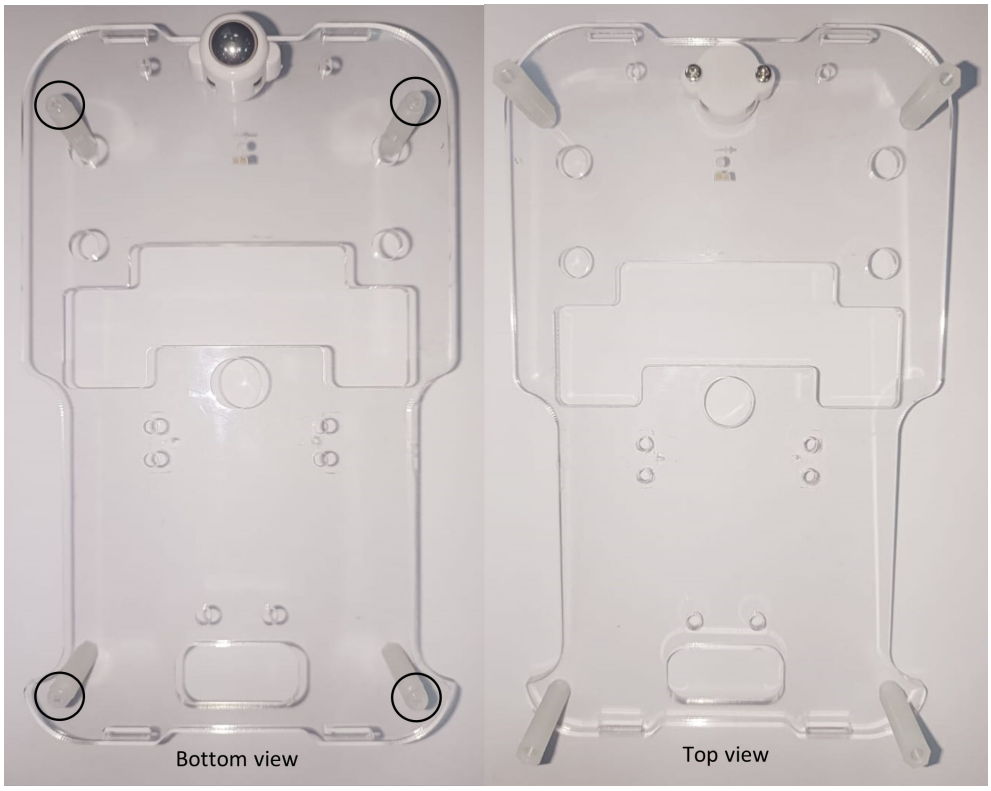


2.3 Check mounted standoffs

Step 1. Ensure that each screw(M3) is aligned correctly with the holes in the standoffs.

Step 2. Press down firmly and use a screwdriver to secure the screws(M3) into the female-female standoffs from the bottom of the frame.

Figure 6. Standoffs placed on bottom frame, bottom and top view



2.4 Place mounts on motors

Step 1. Identify the metal mounts and the motors from your kit parts.

Step 2. Align the mounting holes on the metal mounts with the corresponding holes on the motors.

The orientation of the mounts should match the design specifications for proper assembly onto the frame.

Step 3. Use the long screws provided to attach each motor with the metal mount. Insert the long screws through the holes in the motor by placing the metal mount to it and use the nuts to tighten it with a suitable screwdriver.

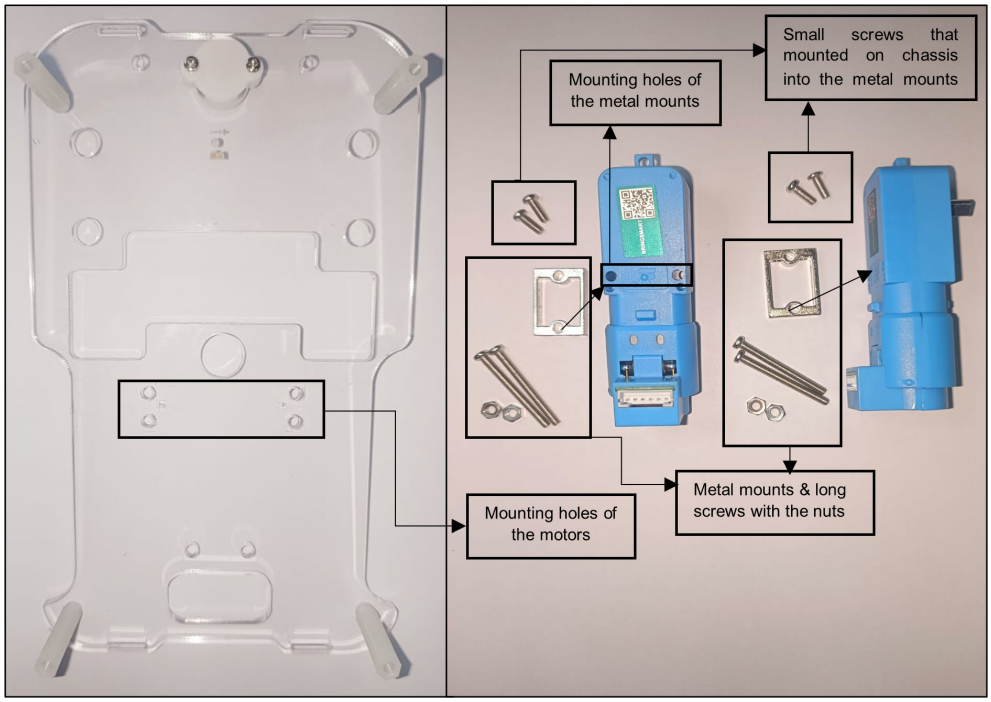
Step 4. Tighten the long screws using a suitable screwdriver until the metal mount is firmly secured to the motor.

Ensure that the metal mounts are attached in a manner that will allow them to be easily fixed to the frame in the following steps.

Step 5. Before tightening the long screws firmly, attach the motor to the frame and verify the orientation of the holes close to the frame. Once the orientation is confirmed, proceed to tighten the screws securely.

Note: After completing this step, each motor should have a metal mount securely attached to it, ready for installation onto the frame. Ensure that all motors are prepared before proceeding.

Figure 7. Placement of metal mounts on the motor



2.5 Fix mount with motor to the lower frame

Step 1. With the metal mounts already attached to the motors, position each motor at its respective location on the frame as per the design layout.

Step 2. Align the holes in the metal mounts with the corresponding mounting holes on the frame, taking care that the corners of the nuts do not touch with the frame.

Refer to Figure 8 to avoid confusion regarding the location of the motor mounting holes.

Step 3. Secure each motor to the frame using the appropriate small screws. Insert the small screws from the bottom through the metal mounts and into the frame mounting holes.

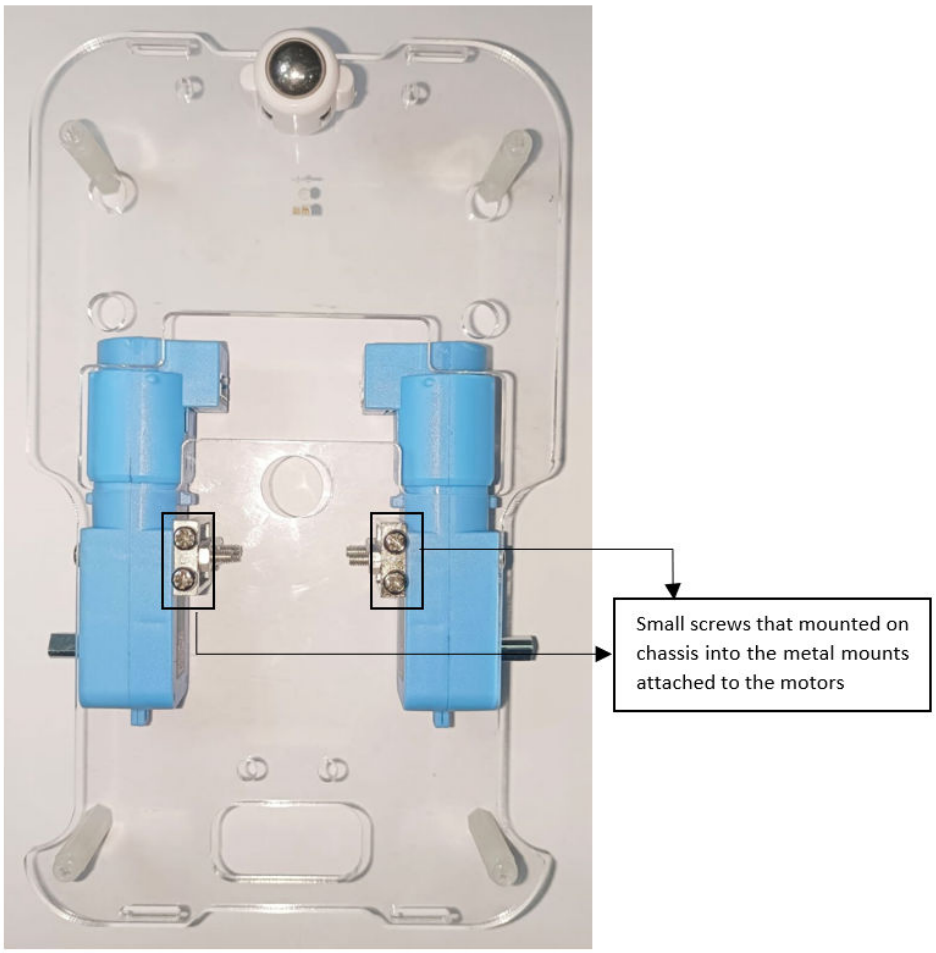
Step 4. Tighten the small screws with a screwdriver until the motor is firmly attached to the frame.

Step 5. Ensure that the motor is stable, aligned with the frame on the wheel side, and that the metal mount does not wobble.

Note: Handle the motors gently to avoid damage to the motor shafts and electrical connections.

Note: Be mindful of the orientation of the motors; the motor shafts should be positioned to allow for the correct installation of wheels or gears as required by your design.

Figure 8. Placement of motors on bottom frame, bottom view



2.6 Fix plastic mount to upper frame

Step 1. Locate the plastic mounts and corresponding bolt and nut that will be used to secure the imaging board (STEVAL-ROBKIT1-3) to the front part of the frame.

Step 2. Determine the positions on the frame where the plastic mounts will be installed.

Step 3. Place the first plastic mount in its designated position on the frame.

Step 4. Insert a bolt through the hole in the first plastic mount and into the predrilled hole on the frame.

Step 5. Using a mini flat-head screwdriver, tighten the bolt using the hex nut until the plastic mount is securely fastened to the frame.

Be careful not to overtighten and strip the bolt or damage the mount.

Step 6. Insert the second plastic mount onto the first plastic mount for placing the imaging board (STEVAL-ROBKIT1-3) on it, the nuts used to tighten the two parts must be inserted in the second plastic mount.

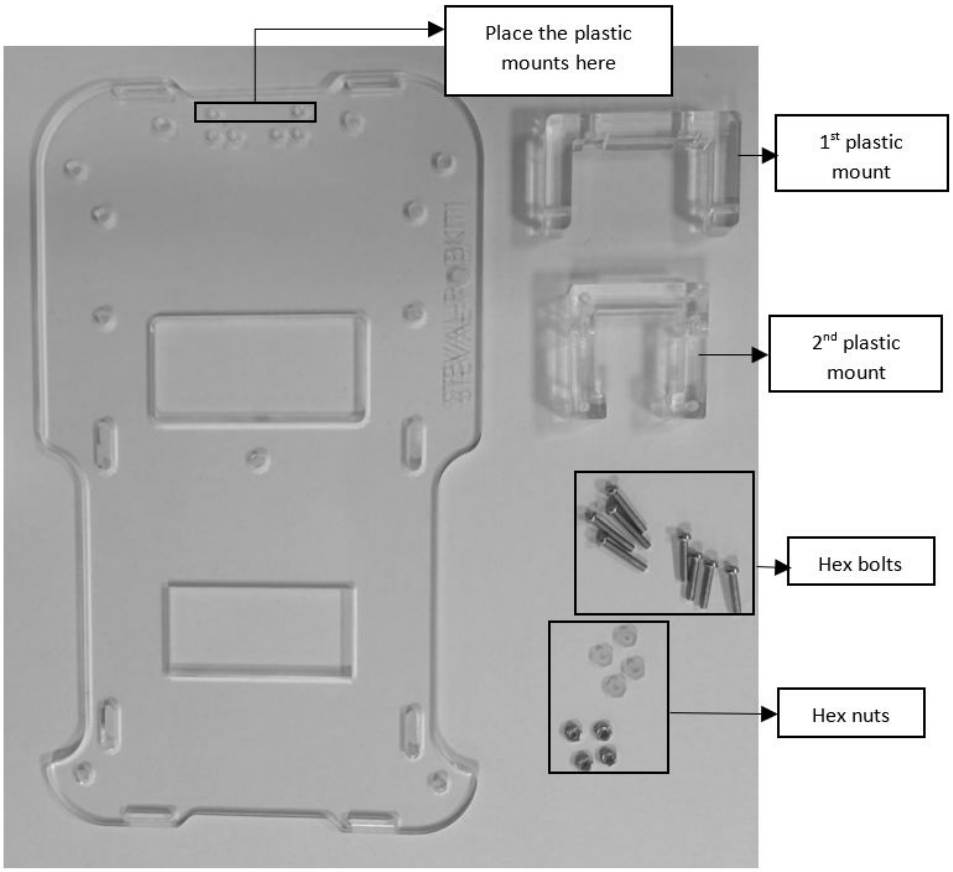
There are six holes in the second plastic mount in total:

– two holes for fixing on to the first plastic mount
– four holes on the front side for mounting the imaging board (STEVAL-ROBKIT1-3).

Step 7. Once all the plastic mounts are in place and securely attached, verify their stability and check that they are ready for the installation of the imaging board.

Note: Do not attach the imaging board yet.

Figure 9. Placement of plastic mounts on the upper frame, top view



2.7 Check plastic mount placement

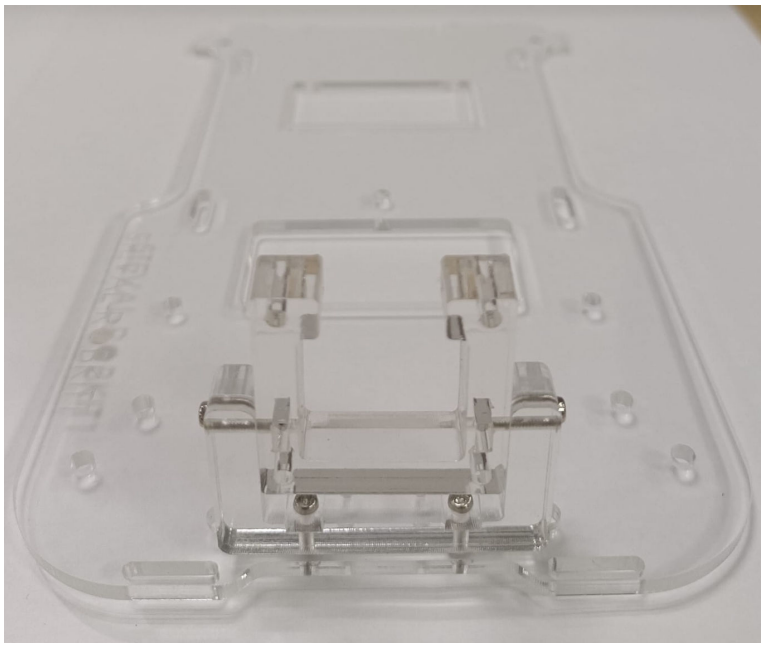
Step 1. Inspect each of the plastic parts that you have attached to ensure they are securely fastened to the frame and use tweezers to screw the nuts of the first and second plastic mounts.

Step 2. Confirm that the plastic parts are aligned correctly as per the assembly instructions, with no angle or position deviations.

Step 3. Check that the hex nuts are tightened enough to hold the plastic parts in place without any wobbling or movement.

With the plastic parts now attached to the frame, the base is ready for mounting the imaging board.

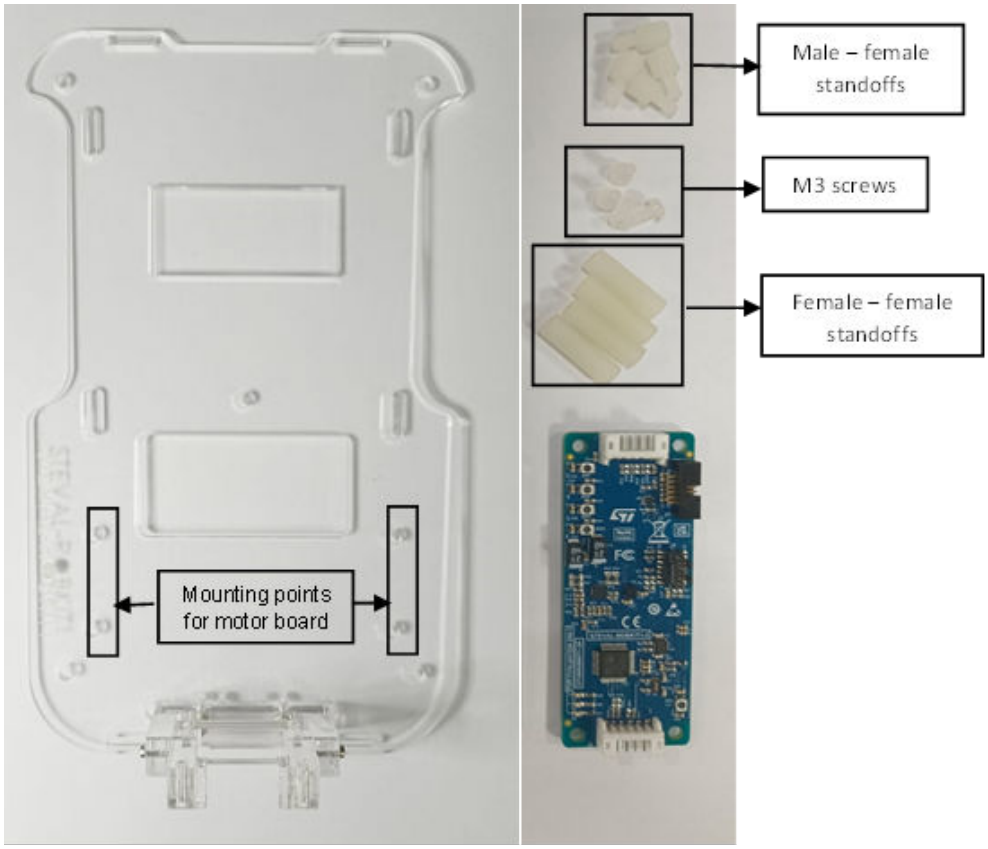
Figure 10. Plastic mount placement on upper frame



2.8 Locate the motor board and mounting components

Step 1. Identify the motor board (STEVAL-ROBKIT1-2) and the mounting screws (M3) designated for attaching it to the top layer of the frame.

Figure 11. Placement of standoffs, screws, and motor board on top side of upper frame



2.8.1 Place the standoffs on the upper frame

Step 1. Locate the mounting points on the top part of the frame where the motor board will be installed.

Step 2. Insert the M3 mounting screws from the bottom of the frame through the mounting holes for the male-female standoffs, above which the motor board (STEVAL-ROBKIT1-2) is placed.

Step 3. Align the four male-female standoffs with the screws present in the hole and tighten the male-female standoffs with the M3 mounting screws.

Step 4. Using a screwdriver, tighten each M3 mounting screw.

Note: Be careful not to overtighten the screws, as this could damage the acrylic frame.

Figure 12. Standoffs placed on upper frame

2.8.2 Place the motor board on the standoffs

Step 1. Now, place the motor board (STEVAL-ROBKIT1-2) on the top of the male-female hex standoffs. Ensure that the board is level and that, there is no undue stress on the board or frame.

Step 2. Inspect the motor board to ensure that it is properly secured to the frame with the M3 mounting screws and the required male-female hex standoffs.

Figure 13. Motor board attached to standoffs

2.8.3 Mount the standoffs on the motor board

Step 1. Check that the board does not wobble or move, confirming that the screws are tight enough to hold the board in place securely with the help of male-female standoffs.

Step 2. Now place the female-female hex standoffs by connecting it with the male-female hex standoffs that attached with the motor board and tighten it until they are snug.

Step 3. Once all the female-female standoffs are in place, verify their stability and check that they are ready for the installation of the main board (STEVAL-ROBKIT1-1)

Figure 14. Motor board placement between standoffs on upper frame

2.8.4 Attach the motor cables to motors on the lower frame

Step 1. Locate the 6-pin motor cable and the ferrite clamps that connect to the motor board (STEVAL-ROBKIT1-2) and the motors. Attach the ferrite clamps to both sides of the 6-pin motor cable after removing them from the kit packaging.

Step 2. Make sure that each of the 6-pin motor cables is correctly placed into the ferrite clamps.

Step 3. Identify the connection points (plug-in connectors) on the motors where the cables need to be attached.

Step 4. Take the first motor connector cable and align it with the connection point on the motor, ensuring the correct orientation.

If the connectors are keyed or have a specific shape, this will help prevent incorrect attachment.

Note: Depending on the type of connection used by your motors, the cabling might require a different connection method, such as a screw.

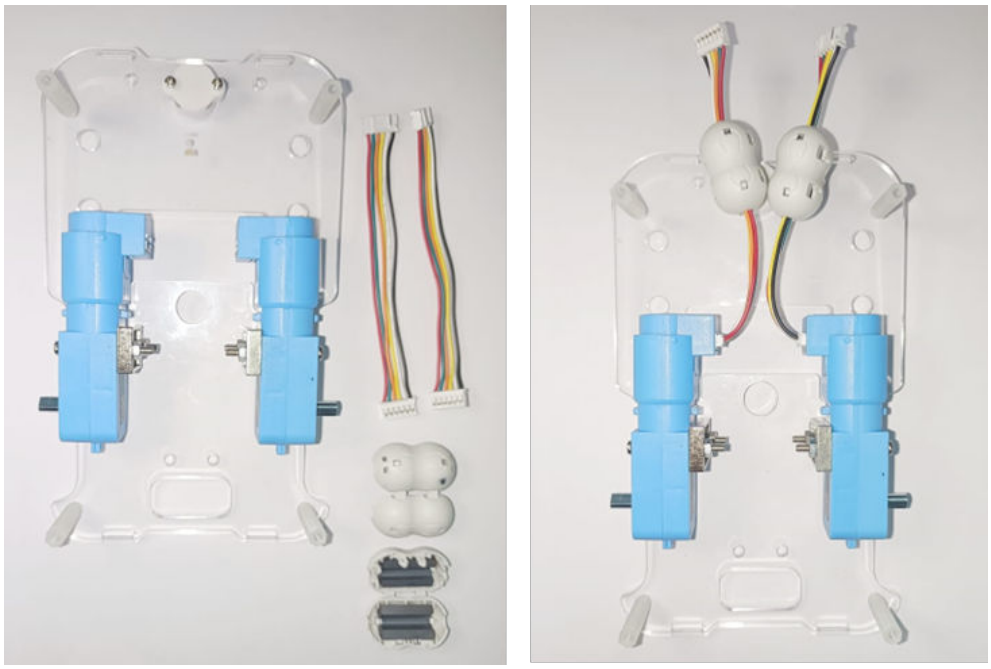
Step 5. Confirm that the connection is secure and that there is no risk of it coming loose during the operation of the robot.

Step 6. Check each motor to ensure that the connectors with the ferrite clamps are attached properly and inserted at one end. Each connector should be seated firmly and not loose.

The ferrite clamps suppress high-frequency signals on a power-supply line, benefiting from the high magnetic susceptibility of ferromagnetic material.

Step 7. This helps to suppress unwanted noise and radiation in electric and electronic applications.

Figure 15. Cables and ferrite clamps (left); cables and ferrite clamps attached to motors (right)



2.9 Connect the battery pack

Step 1. Locate the battery pack, which holds four 1.5 V AA non-rechargeable batteries. Ensure you have the correct type of batteries as specified by the manufacturer.

Step 2. Insert the batteries into the battery pack, paying close attention to the correct orientation of the positive (+) and negative (-) ends as indicated by the battery pack markings.

Step 3. Once all batteries are securely in place, close the battery pack with the lid or cover and tighten it with the small metal screw given in the package. Ensure that the battery holder is fixed to the frame using the double-sided tape.

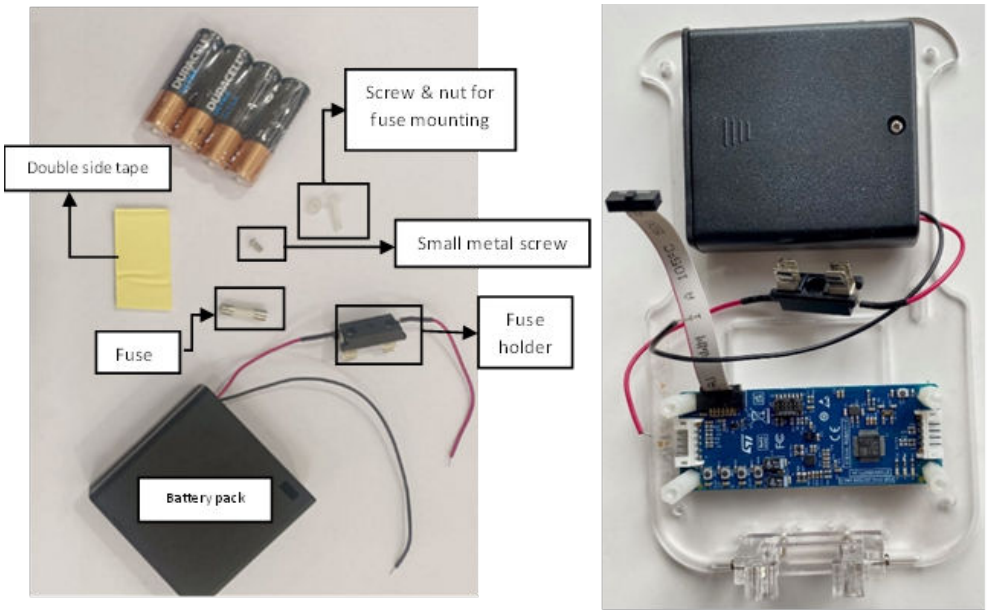
Step 4. Identify the positive and negative wires coming from the battery pack: red for positive (+) and black for negative (-), respectively.

Step 5. Attach the battery pack to the frame using the double-sided tape.

Step 6. Insert the 12-pin flat cable into the motor board (STEVAL-ROBKIT1-2) on the J1 connector.

Note: Nonrechargeable batteries work better than rechargeable batteries in situations where a low amount of power is needed for a long time.

Figure 16. Battery pack components (left); assembled battery pack (right)



2.10 Join the frames

Step 1. Prepare the top part of the frame, which now has the motor board and battery pack installed and the bottom part of the frame with the motors installed.

Step 2. Insert the front and rear plastic closers in the holes available in the bottom frame.

Step 3. Align the top part of the frame over the bottom part, ensuring that the female-female standoffs on the bottom part line up with the corresponding mounting holes on the top part.

Step 4. Take the M3 mounting screws that are used to join the two parts of frame together.

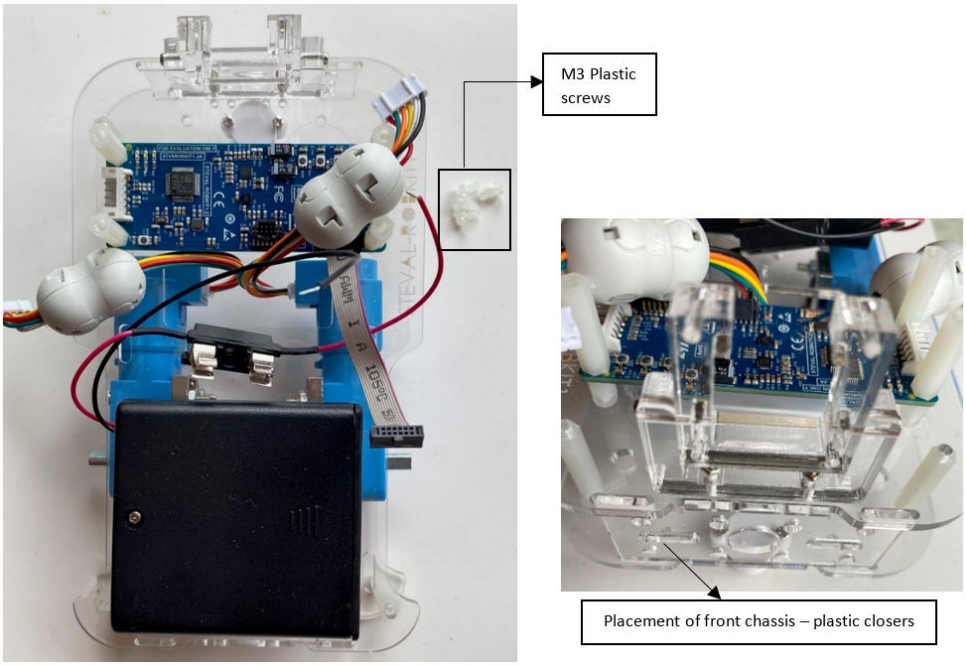
Step 5. Start by inserting the first M3 mounting screw through the top part of the frame and into the threaded hole of the corresponding standoff on the bottom part.

Step 6. Using a screwdriver, gently tighten the M3 screw until it is snug but not fully tightened. This will allow for slight adjustments as you align the remaining screws.

Step 7. Proceed to insert and partially tighten the rest of the mounting screws(M3) in the same manner.

Step 8. Once all screws(M3) are in place and the top and bottom parts are correctly aligned, fully tighten each screw in a cross pattern to ensure even pressure and a secure fit.

Figure 17. Attachment of the frames



2.11 Connect 6-pin motor cables to motor control board

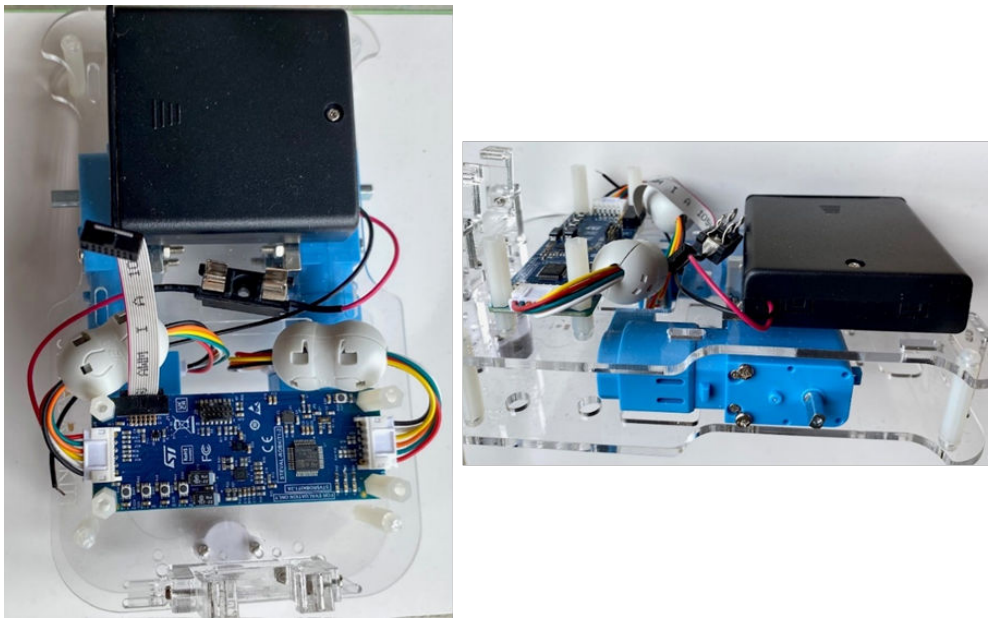
Step 1. Take the first motor cable that comes with the connector in the package and carefully align it with the appropriate port on the motor board (STEVAL-ROBKIT1-2) as shown in the figure below. Ensure that the connector matches the port configuration to avoid incorrect connections.

Step 2. Gently insert the 6-pin motor cable connector into the port on the motor board. If the connection is keyed or has a specific orientation, make sure it is aligned correctly before applying pressure.

Step 3. Once the motor cable connector is in place, apply slight pressure to ensure a firm connection.
Some connectors will click into place, while others may simply push in snugly without an audible click.

Step 4. Secure the cable so that it does not interfere with any moving parts or other connections.

Figure 18. Placement of 6-pin motor cables to the motor control board



2.12 Place the main board above the motor board

Step 1. Locate the main board (STEVAL-ROBKIT1-1) and the M3 mounting screws included for attaching it to the female-female standoffs.

Step 2. Carefully position the main board above the motor board (STEVAL-ROBKIT1-2), aligning its mounting holes with the female-female standoffs that were previously installed on the top of the motor board.

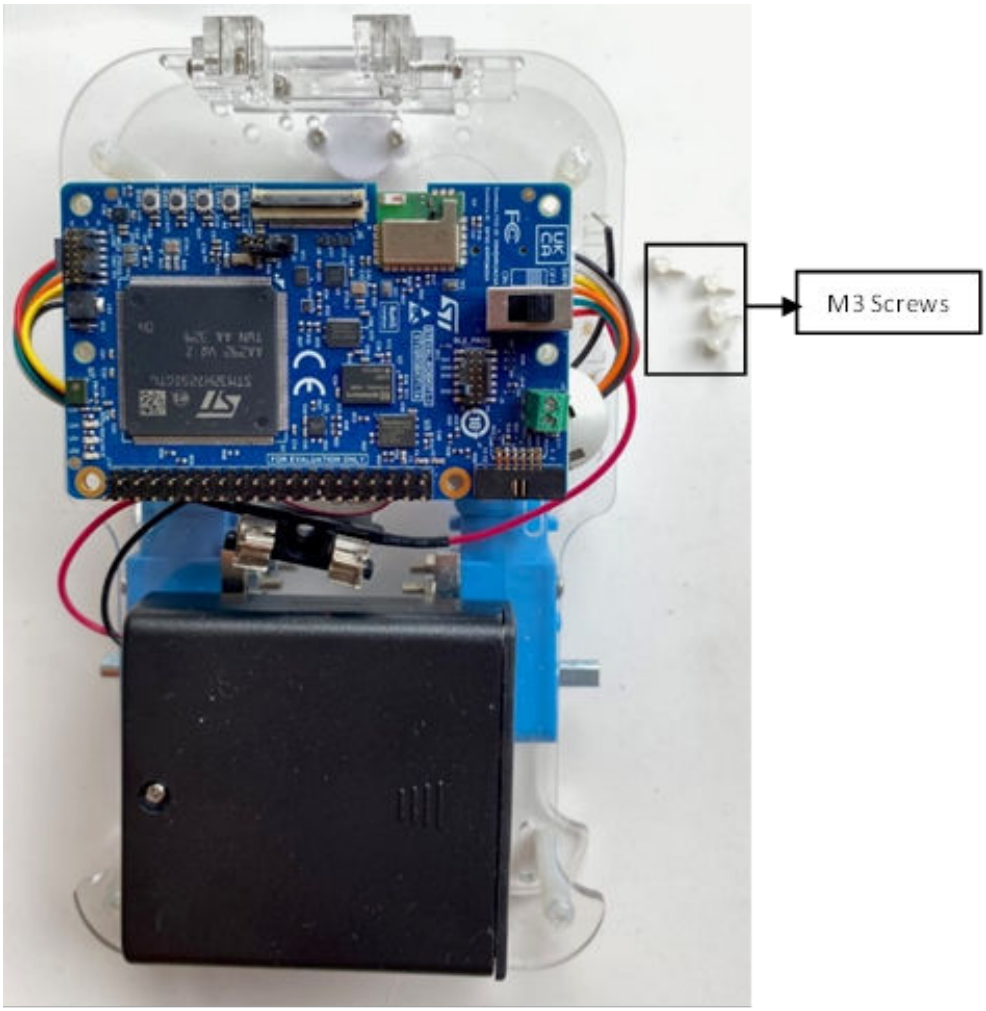
Step 3. Gently lower the main board onto the mentioned standoffs, ensuring that it is correctly oriented as per the assembly instructions.

Step 4. Insert the M3 mounting screws through the holes in the main board and into the threaded tops of the female-female standoffs.

Step 5. Use a screwdriver to tighten each M3 screw, securing the main board to the female-female standoffs. Tighten the screws until they are snug, ensuring the main board is firmly attached but without applying excessive force that could damage the board or the respected standoffs.

Note: Double-check that no components on the underside of the main board are in contact with the motor board, which could cause shorts or damage when powered on.

Figure 19. Attachment of main board to standoffs with mounting screws



2.13 Check placement of main board and motor board

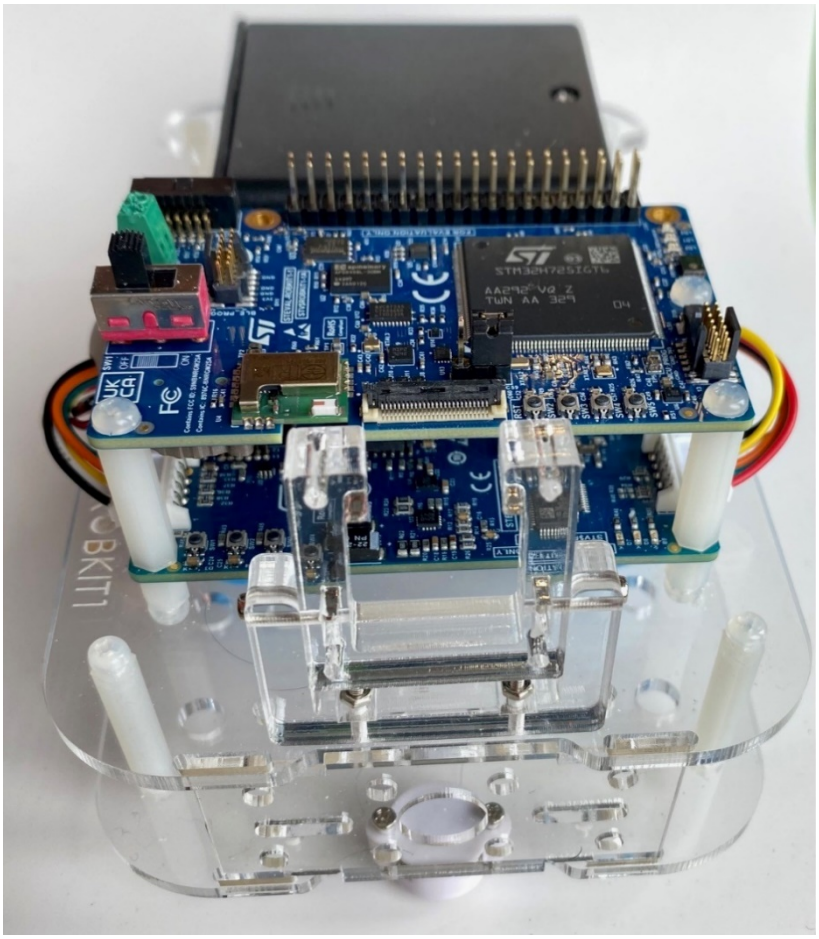
Step 1. Perform a thorough inspection of the frame to ensure that both the main board (STEVAL-ROBKIT1-1) and the motor board (STEVAL-ROBKIT1-2) are installed correctly.

Step 2. Check the alignment of the boards to confirm they are parallel to the frame base and that all standoffs are providing even support.

Step 3. Make sure that there is no undue stress on any of the boards or components, and none of the screws are excessively tightened.

Step 4. Look over the entire assembly for any loose parts, tools, or material that may have been left on or near the boards.

Figure 20. Placement of main board and motor board



2.14 Attach fuse, 12-pin flat cable, and battery wires

By following the preceding instructions, the battery holder should already be in place.

Step 1. Now take the fuse that connects between the positive wire of the battery holder, take the screw and insert it before inserting the fuse into it.

Step 2. Tighten the screw with the given nut onto the frame then fix the fuse in it.

Step 3. Ensure that the fuse holder is securely mounted on the frame, with the fuse installed between the battery holder of the positive wire and with the power supply connection.

Step 4. The positive wire of the battery holder is connected to the fuse that links to the power supply, followed by the negative wire that connects directly to the power supply to safeguard the wiring and the appliance and to avoid human safety problems.

Step 5. Before connecting the battery wires, ensure that the power switch is in the "OFF" position to prevent any short circuits or accidental power-on events.

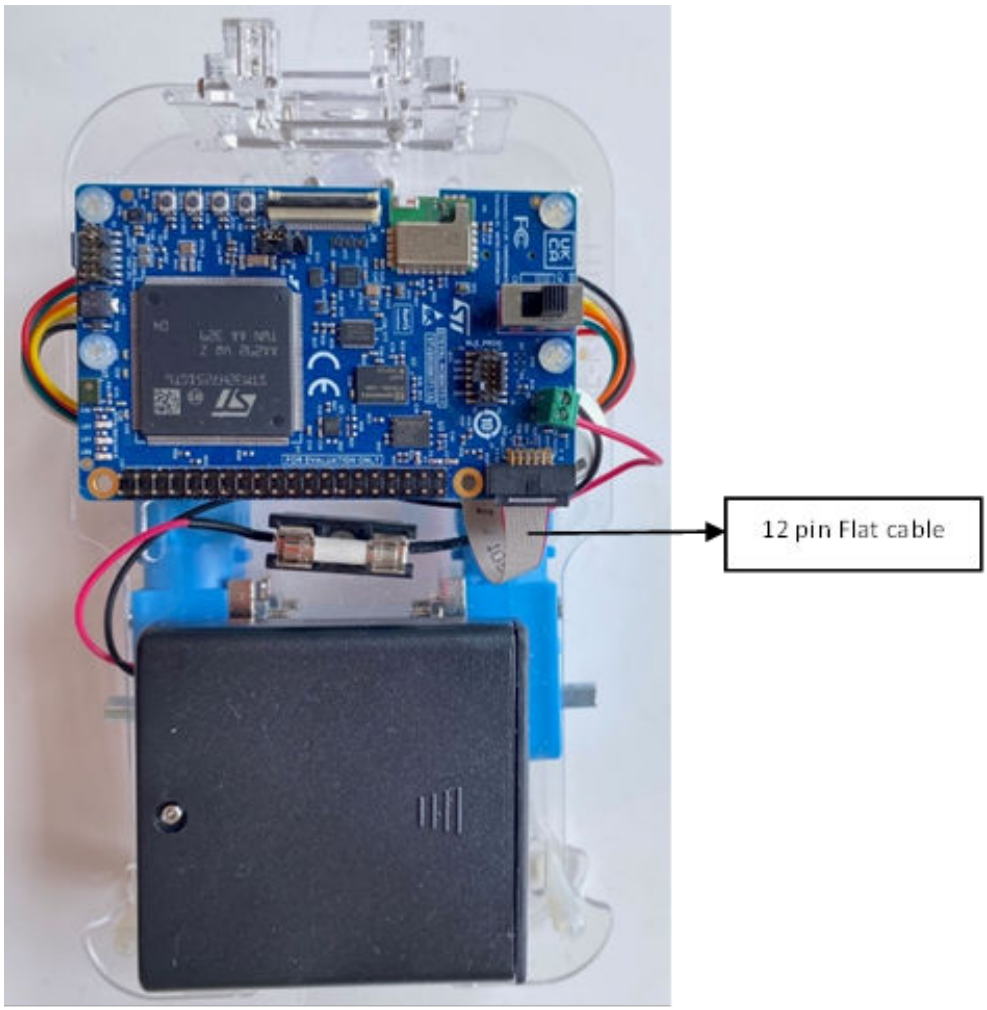
Step 6. Connect the positive wire (red) to the marking of ‘6v’ and the negative wire (black) to the ‘Gnd’ mentioned on the J4 connector of the main board (STEVAL-ROBKIT1-1).

Step 7. Once connected, route the combined wire away from the motors and any moving parts that may damage the insulation or cause wear over time.

Step 8. Also, keep the wire clear of any heat-generating components that could melt the insulation or otherwise compromise the wire.

Step 9. Connect the 12-pin flat cable to the main board (STEVAL-ROBKIT1-1) on the J7 connector.

Figure 21. Placement of 12-pin cable and fuse with battery wires



2.15 Mount imaging board on plastic mount

Step 1. Position the imaging board (STEVAL-ROBKIT1-3) above the frame, aligning its mounting holes with the plastic mounts you previously installed.

Step 2. Gently lower the imaging board onto the plastic mounts, making sure that the board is properly oriented

Step 3. Once the imaging board is in place, take the bolts and nuts that are designed to secure the board to the plastic mounts.

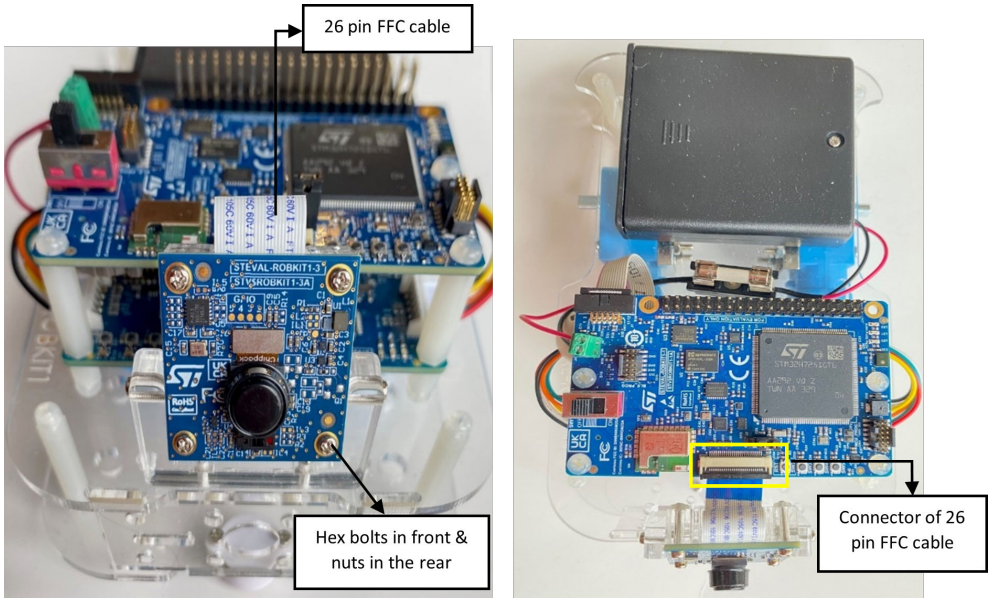
Step 4. Insert the bolts through the mounting holes of the imaging board and into the receiving threads or holes of the plastic mounts

Step 5. Use a screwdriver to tighten the bolts, securing the imaging board to the mounts. Tighten the hex bolts until they are snug, but be careful not to overtighten them, as this could damage the board or the mounts.

Step 6. Gently open the camera board connector J6 on STEVAL-ROBKIT1-1, insert the 26-pin FFC cable already connected on one end to the STEVAL-ROBKIT1-3, and then lock it. Make sure that the cable is correctly placed and does not have any loose connections.

Note: Before securing the imaging board, double-check that all connectors, lenses, or sensors on the board are not obstructed and are facing the correct direction.
Check and remove the protection film in front of the ToF sensor placed on the imaging board.
Take caution when removing the protection cap in front of the camera module.

Figure 22. Placement of imaging board on plastic mount

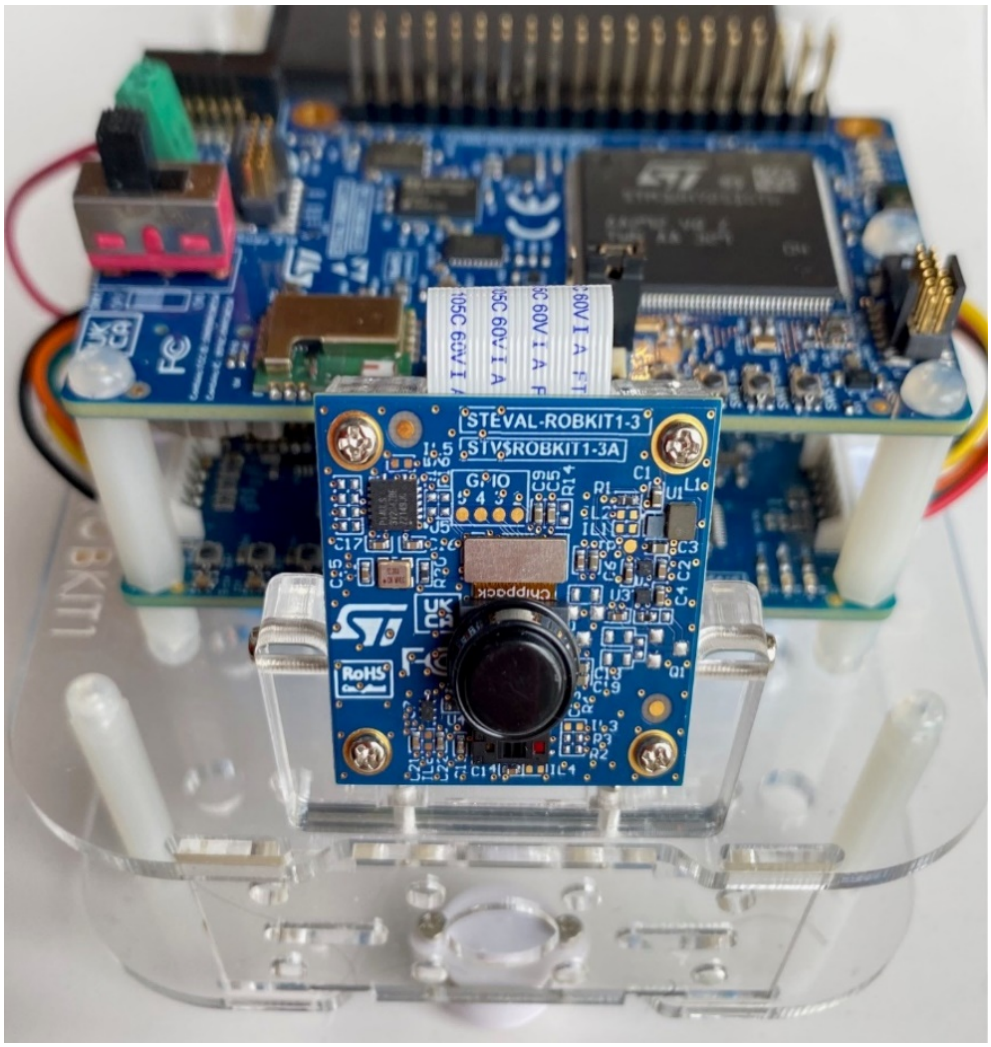


2.16 Check placement of imaging board

Step 1. Check that the imaging board (STEVAL-ROBKIT1-3) is properly placed with the plastic mount without any loose connections. Keep the camera board angled 90 degrees to the ground.

Proper installation of the imaging board is crucial for optimal performance, as it often contains sensitive components that need to be accurately aligned and free from mechanical stress.

Figure 23. Placement of imaging board



2.17 Place the wheels

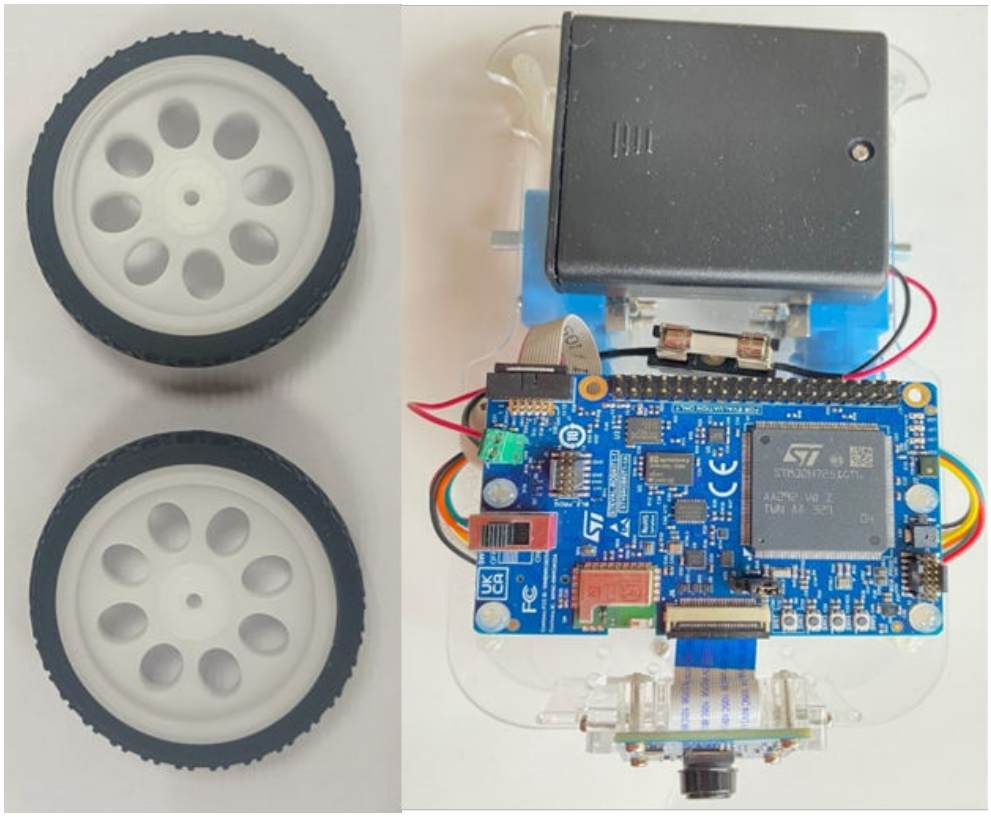
Step 1. Gather the wheels that will be attached to the motor shafts.

Step 2. Bring the first wheel to its center position and attach it to the shaft of the motor.

Step 3. Align the wheel directly with the motor shaft, ensuring that the set screw hole is accessible and facing outwards for easy tightening.

Step 4. Carefully slide the wheel onto the motor shaft, making sure it is pushed all the way in for a secure fit. The wheel should be perpendicular to the shaft for proper operation.

Figure 24. Placement of wheels on motor shafts



2.18 Check the kit before prepowering

Step 1. Confirm that the battery wires are fixed securely and that the routing is finalized, with no loose ends or dangling wires.

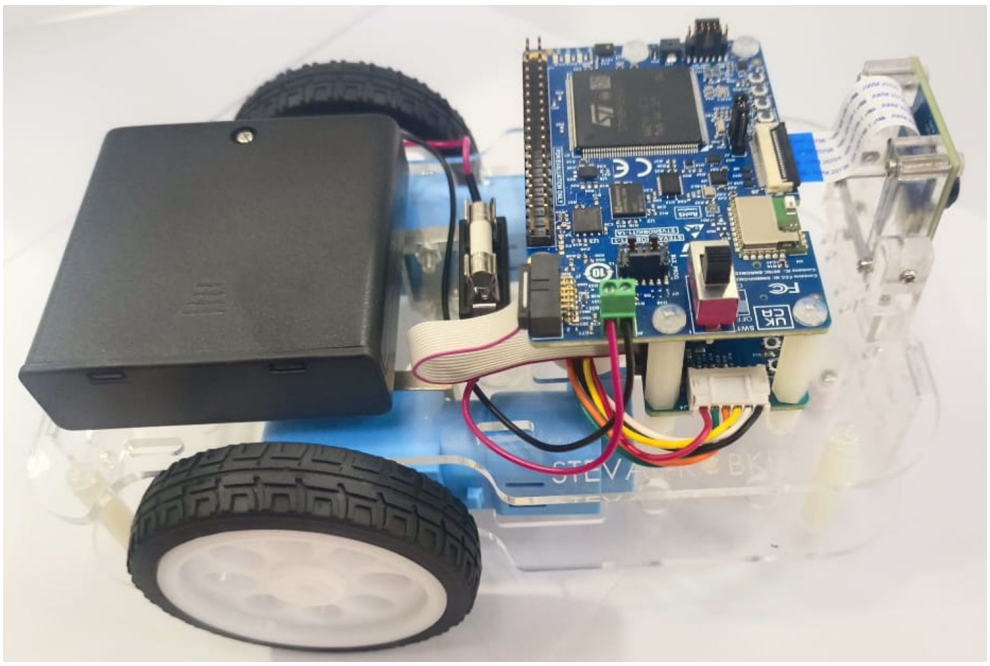
Step 2. Reinspect the wire placement to ensure that the battery wires are indeed kept away from motors, sensors, and any mechanical parts that move or generate heat.

Step 3. Check that all wire connections, including those on the main board (STEVAL-ROBKIT1-1) and motor board (STEVAL-ROBKIT1-2), remain intact and have not been disturbed during the wire management process.

Step 4. The kit requires 6 V to function properly and ensure that the battery pack is mounted stably and that the batteries are properly seated within the pack.

Step 5. Review the entire assembly for any tools, screws, or other objects that should be removed from the workspace before powering on the robot.

Figure 25. Final prepower checklist



2.19 Check fully assembled robot

The package of the kit comes with all the boards preflashed.

Step 1. Refer to the STEVAL-ROBKIT1 user manual available here: https://www.st.com/en/evaluation-tools/steval-robkit1.html

Step 2. Switch on the power and observe any LEDs or indicators that signal the kit is powered correctly.

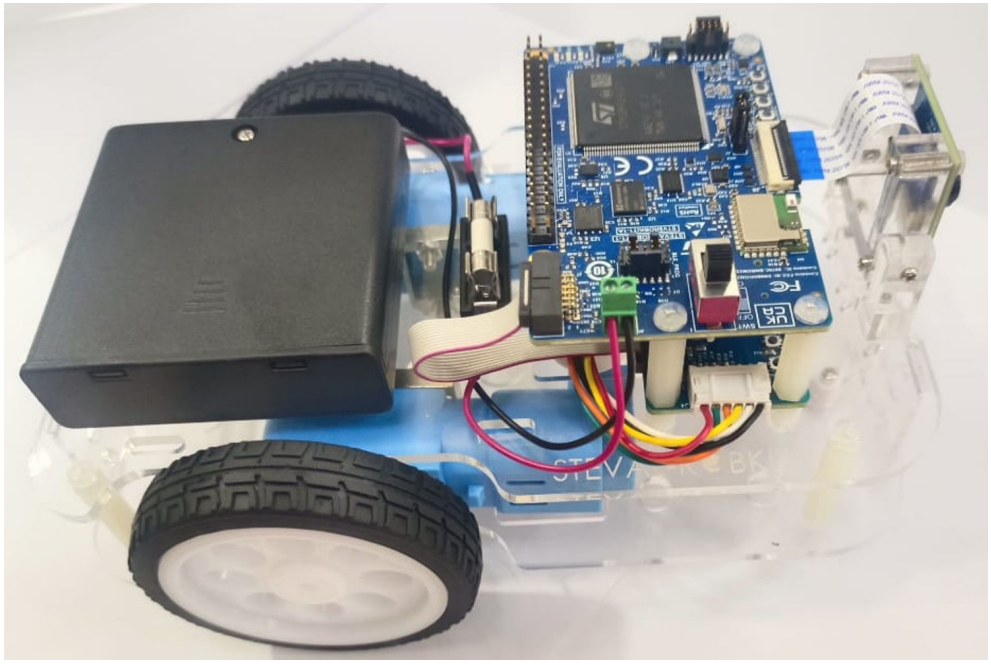
Step 3. Locate the firmware file for your robotic kit so you can view the code or use it for any additional development.

- Firmware link: https://www.st.com/en/embedded-software/stsw-robkit1.html
- ST Robotics mobile app:
  - Android: https://play.google.com/store/apps/details?id=com.st.roboticsandpcampaignid=web_share
  - iOS: https://apps.apple.com/us/app/st-robotics/id6739212512

Step 4. Once everything is confirmed working, you can begin interacting with your robotic kit by connecting it with the ST Robotics mobile app.

Step 5. Explore its capabilities, program new features, and consider potential upgrades or modifications.

Figure 26. Fully assembled STEVAL-ROBKIT1



Appendix A Reference design warnings, restrictions and disclaimer

Important: *The reference design is not a complete product. It is intended exclusively for evaluation in laboratory/ development environments by technically qualified electronics experts who are familiar with the dangers and application risks associated with handling electrical/mechanical components, systems and subsystems.*

Danger: *Exceeding the specified reference design ratings (including but not limited to input and output voltage, current, power, and environmental ranges) may cause property damage, personal injury or death. If there are questions concerning these ratings, contact an STMicroelectronics field representative prior to connecting interface electronics, including input power and intended loads. Any loads applied outside of the specified output range may result in unintended and/or inaccurate operation and/or possible permanent damage to the reference design and/or interface electronics. During normal operation, some circuit components may reach very high temperatures. These components include but are not limited to linear regulators, switching transistors, pass transistors, and current sense resistors which can be identified in the reference design schematic diagrams.*

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Revision history

Table 2. **Document revision history**

Date	Version	Changes
02-Feb-2026	1	Initial release.

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