Edison

Edison V3 repair guide

Guide to repairing the Edison V3 robot

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About this guide

This guide is to assist anyone repairing an Edison V3 robot that has developed a fault either through a non-warranty breakage or is outside the warranty period.

Many of the repair processes in this guide can be completed by someone with minimal repair experience, however some repairs require equipment (such as a fine soldering iron) and experience or qualifications with electronic repair (service professional).

This guide is provided in good faith in the hope that it allows Edison V3 robots to be repaired and saved from landfill. The repair advice in this guide is not guaranteed to be easy or successful.

Troubleshooting and repairing are great skills to have. We hope that you develop these skills in this process and feel the joy of having made something work again!!

How to use this guide

Each of the faults are categorised as follows:

- Barcode reading faults
- Drive related faults
- Power related faults
- Programming related faults
- Other faults

Go to the category that best describes the fault you are experiencing and read through the potential faults.

Each fault case has a description, symptom and how the fault can be confirmed. Once you are able to confirm the fault use the repair advice to complete the repair.

For disassembly and reassembly instructions see the following video guide:

https://meetedison.com/repair-guide/

Tools

Some of the repairs in this guide require the use of tools. Here is list of tools that you might need:

- 2mm hex/Allen key (to disassemble and reassemble Edison)
- Needle nose pliers (Removing tight parts)
- Fine tip soldering iron (Reflow soldering or replacing electronic components)
- 2mm drill bit and drill (removal of broken wheel axle from shaft)

Edison lights and status

The two red LEDs at the front of the Edison provide information about the robot's current status. This is only the case when a program is not running, as any program that is running will take control of the LED lights. To ensure Edison is not running a program, press the square button.

LED lights flashing alternately = Standby mode

Both LED lights flashing together = Charging

Both LED lights on = Charging complete

Both LED lights flashing rapidly together = Corrupt Firmware

Corrupt firmware can be due to an interrupted firmware update. This can happen due to a loss of internet connection or the robot being removed from the USB port part way through a firmware update. See the fault Stuck in bootloader mode to rectify this.

Barcode reading related faults

The following faults and repair suggestions are related to the Edison V3 robot experiencing trouble reading barcodes and/or following lines.

Dust on Line tracking sensor

A layer of dust can form over the line tracking sensor that prevents the Edison robot from being able to accurately scan barcodes.

Symptoms:

Edison is inconsistent at reading barcodes or detecting a line.

Fault can be confirmed by

The fault can be confirmed visually by looking at the line tracking sensor. This photo shows a build-up of dust on both the red LED and clear phototransistor (light sensor). Note this image is of an Edison V2 robot.

Repair

To remove the dust, use a dry brush (i.e. small paint brush) to clear away the dust.

Cause of fault

When driving on paper, the friction of the Edison's skid can cause particles of the paper to break free and gradually build up over the line tracking sensor. The dust acts as a shade on both the LED and sensor, reducing the amount of light transmitted and received. This reduces the sensitivity of the line tracking sensor and can lead to problems with barcode reading and line detection.

Prevention of the fault reoccurring

The build-up of paper dust takes a long time, so occasional cleaning of the line tracking sensor is the best way to prevent this. If the build-up is much faster, consider using less pulpy paper or smoother paper that will release less paper particles.

Productions that are most affected

All

Production is indicated by the first two digits of the serial number (e.g. 01-99999 = production 01).

Missing skid

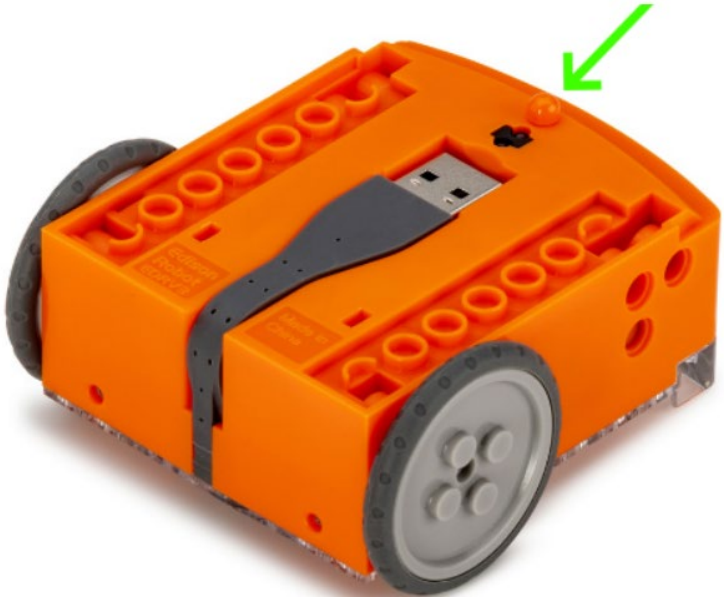
The Edison robot's skid is located under the robot, towards the front. It allows the front of the robot to slide while also maintaining the correct distance between the driving surface and the line tracking/barcode reading sensor. If the skid is not present, then the Edison is not able to read barcodes or detect lines.

Symptoms

Edison will not read barcodes or detect lines.

Fault can be confirmed by

Inspecting visually for the missing skid.



Repair

Replace or reinsert the skid back into Edison, you should hear a distinctive click.

Each Edison V3 is supplied with two additional skids that are included in the packaging.

These are also available in a spare part pack of 20. (available here: https://meetedison.com/shop/)

Additionally, we provide a 3D printing file to print a replacement skid, which may be useful if you have 3D printing facilities. You can find this here: https://www.thingiverse.com/thing:7297990

(Note that while we have done some testing, the fit of the skid and longevity will depend on what material it is printed from, and can be expected to wear down faster than an original skid)

Cause of fault

The skid is a removable part. This allows Edison robots to be stacked and improves compatibility with EdCreate and LEGO bricks.

The skid may have been removed deliberately and/or lost or may have been knocked out.

Prevention of the fault reoccurring

Ensure that if the skid needs to be removed that it is stored in a safe place.

A potential cause of the skid being knocked out is when driving on tiles and the skid gets caught in the gap between the tiles. Try driving Edison on flat smooth surfaces.

Another potential cause is when driving between two connected desks but with a gap wide enough for the skid to be caught in. Ensure that when driving between desks that there is no gap between the desks.

Productions that are most affected

All

Production is indicated by the first two digits of the serial number (e.g. 01-99999 = production 01).

Drive related faults

The following faults and repair suggestions are related to the Edison V3 robot experiencing trouble when driving.

Will not turn accurately

The Edison V3 robot has the ability to make a 90-degree turn with an accuracy of +/-2.5 degrees. This means that a 90-degree turn will be between 87.5 and 92.5 degrees. For the Edison robot, not turning accurately, means a 90-degree turn is either greater than 92.5 degrees or less than 87.5 degrees.

Symptoms

When Edison is programmed to turn in degrees the result is greater or less than the programmed value and is outside the turning tolerance of +/-2.5 degrees (87.5 and 92.5 degrees).

Fault can be confirmed by

Programming the Edison V3 to turn or spin 90 degrees and checking whether the resulting turn or spin is between 87.5 and 92.5 degrees.

Repair

If the turn or spin from the test above is greater than 92.5 degrees, then the issue is very likely to be due to the robot's calibration. Use the turn calibration instructions here to recalibrate: https://meetedison.com/turn-calibrate-the-edison-v3-robot/

If the turn or spin from the test above is less than 87.5 degrees, then the issue could be either the robot's calibration (Use the turn calibration instructions here to recalibrate: https://meetedison.com/turn-calibrate-the-edison-v3-robot/), or one of the following:

1. Driving surface has too much friction

If the driving surface has too much friction on the skid, then the skid will not slide preventing accurate turning. This can sometimes be seen as the robot's turning movement being jerky, rather than a smooth constant turn. Retest the 90-degree turn on a laminated desktop or piece of plain paper. If the robot turns accurately in these tests, then the original driving surface is too rough for the skid to slide smoothly. Examples of surfaces that can be too rough for accurate turning are: concrete, carpet, tiles and some matte printed finishes.

2. Driving surface is too slippery

If the driving surface is too slippery, then the tires maybe slipping and preventing the robot from turning accurately. This can sometimes be seen as the robot's turning movement being jerky, rather than a smooth constant turn. Retest the 90-degree turn on a laminated desktop or piece of plain paper. If the robot turns accurately in these tests, then the original driving surface is too slippery for the tires to have good

traction. Examples of surfaces that can be too slippery for accurate turning are any surface that is oily such as an oiled wood table or floor and any surface that is wet or damp.

3. Dirty or oily tyres

If the tyres are dirty (dusty) or have collected oil, then the tyres maybe slipping and preventing the robot from turning accurately. Remove the tyres from the wheels and clean them using warm water with a small amount of dish soap. Allow them to dry, then fit them to the robot and retest.

4. Material or hair caught in axle

If material or hair is caught in the axle, then the freedom of the wheel to rotate can be affected. Remove the wheel and inspect for any material or hair caught and wrapped around the axle. Any hair or material can be removed and the wheel can be reattached to the robot.

5. Worn down skid

If the skid becomes worn down then the skid's surface area that makes contact with the driving surface will be increased, this results in more friction and reduced turning accuracy. Replace the skid with a new skid and retest.

6. Wheels not pushed fully on

The distance between the wheels affects the turning accuracy. Ensure that the wheels are pushed all the way in when calibrating and when driving.

Cause of fault

The cause of reduced accuracy in turning can be due to poor calibration, driving surface problems, unclean tyres or a worn-down skid.

Prevention of the fault reoccurring

Drive calibrations can be performed regularly and when the driving surface changes.

Ensure that the driving surface is appropriate for accurate turning, such as plain paper or a laminated table top.

Ensure that tyres are clean and free of oil or dirt.

Check for material and hair that can get wrapped around the axle.

Regularly check the skid for excessive wear.

Ensure the wheels are pushed all the way on.

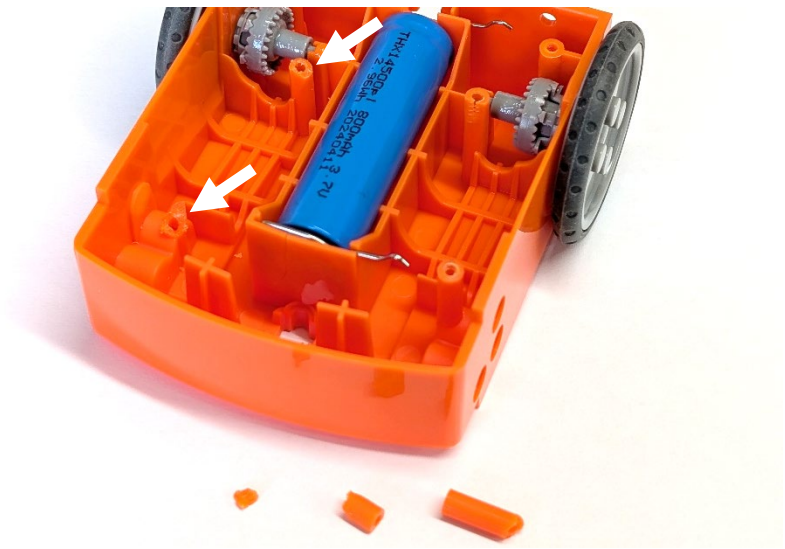
Productions that are most affected

All

Production is indicated by the first two digits of the serial number (e.g. 01-99999 = production 01).

Cracked screw posts

The screw posts are internal plastic posts that the top cover is screwed down on to. Repeated dropping from a height onto a hard surface will result in the eventual breaking of these posts.

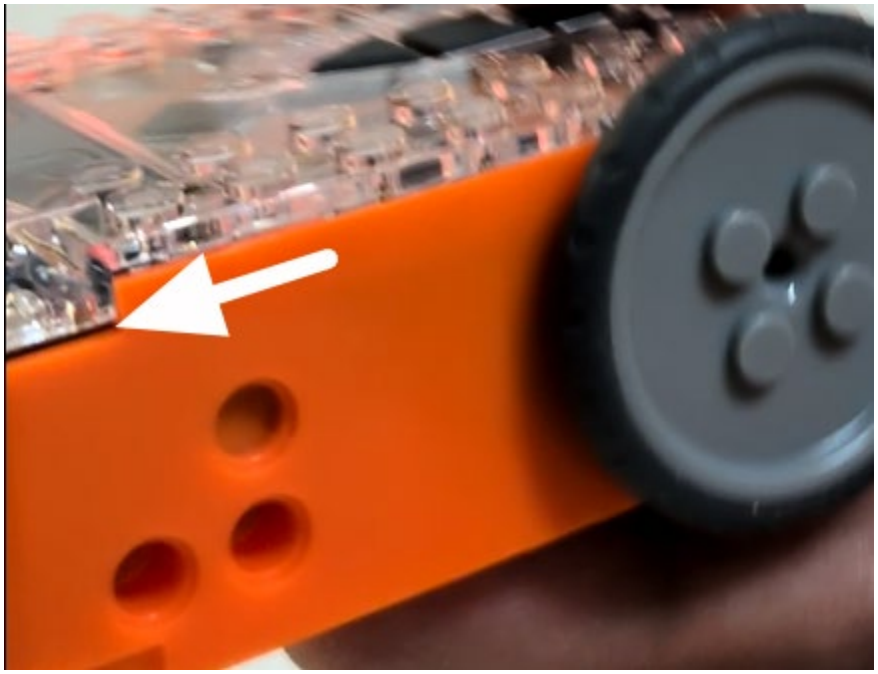


Symptoms

One or both wheels will not drive because the motor terminals no longer have contact with the printed circuit board.

Fault can be confirmed by

There is a gap between the transparent top and the orange chassis.



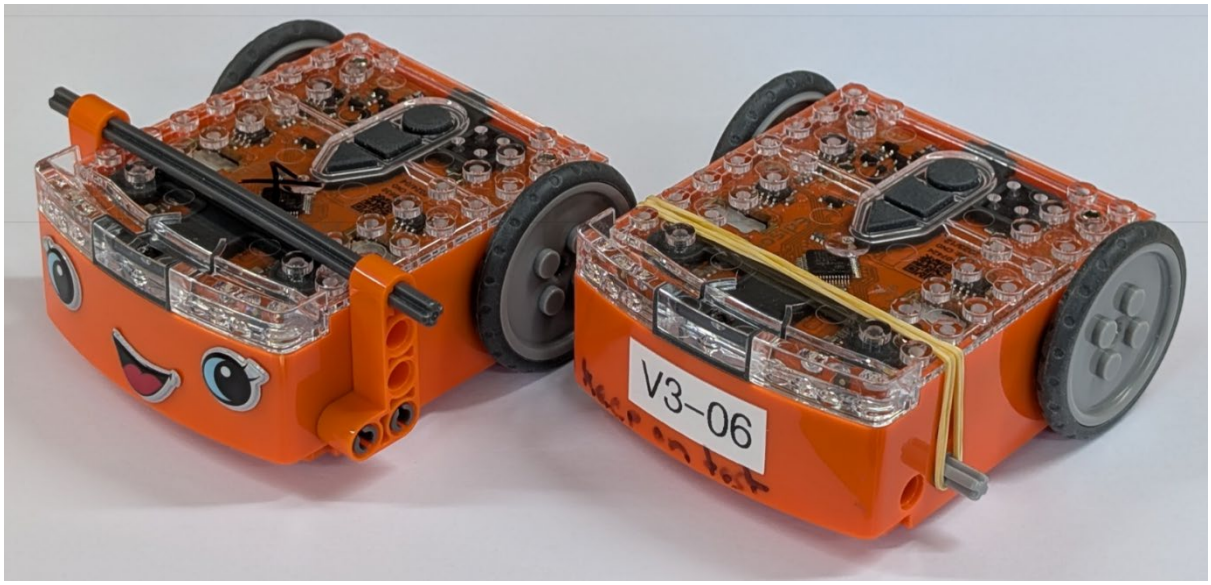
Further, squeezing the top and bottom halves of the robot together and pressing the round button three times allows both of the wheels to drive.

Repair

There are three levels of repair.

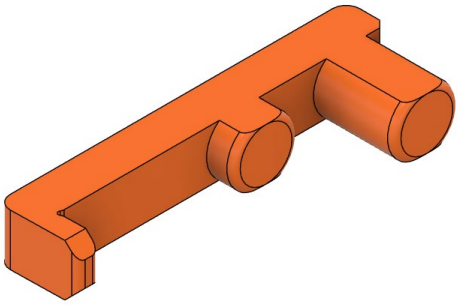
LEGO brick, EdCreate, rubber band

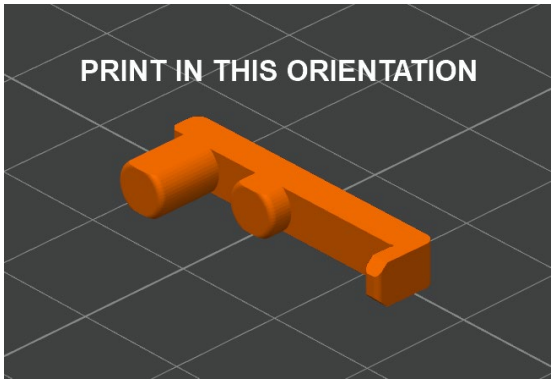
Secure the top down using LEGO, parts from the EdCreate kit or rubber bands. The following two images show how this can be done.



3D print

3D print clamps to hold the orange shell to the top cover. The 3D print file can be found here: https://www.thingiverse.com/thing:7288386





Attach the clips as shown:

Replace chassis

Replace the orange shell (chassis) including matching lower light shield. This requires the plastics spare part pack (part number: EDR001SP006). This can be ordered via the Meet Edison contact form here: meetedison.com/edison-robot-support/contact-us/

Video instructions of the disassembly and reassembly of the Edison V3 robot can be found here:

Note that if the screw posts are cracked away from the chassis, then it is difficult to unscrew as the screw posts just rotates with the screw. Try applying downward pressure as you unscrew. This causes the screw post to lock down into the jagged cracking and to not rotate.

Cause of fault

Repeated dropping from a height greater than 1 metre onto a hard surface causes the internal screw posts to break. When this happens the printed circuit board raises and one or both motors lose their electrical connection. If dropping continues, the battery support wall can crack causing the battery spring to break free and a loss of power to the robot.

Prevention of the fault reoccurring

Educate students to treat the robots with care. Regularly falling from height will eventually cause the Edison robot to stop working.

Productions that are most affected

01 to 11

Production is indicated by the first two digits of the serial number (e.g. 01-99999 = production 01).

Motor terminal not making contact

This is a fault where one of the motor terminals is not making contact with the printed circuit board. This results in one of the motors not being powered and therefore the wheel will not drive.

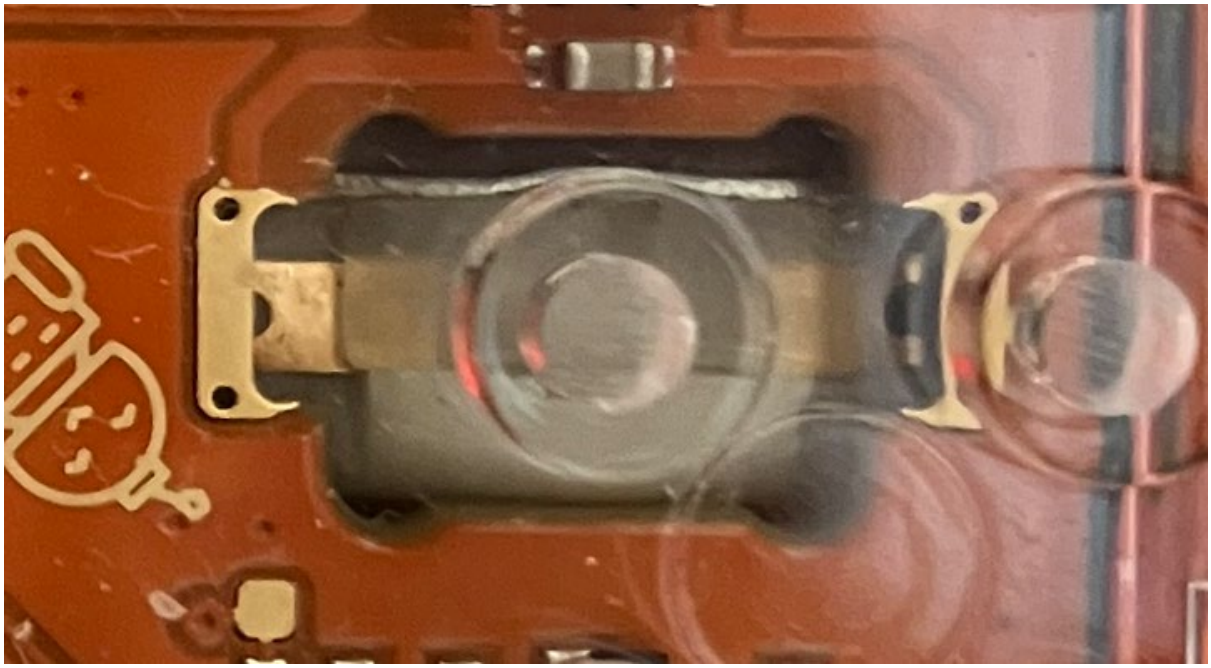
Symptoms

Edison will drive in circles because one motor will not drive.

Fault can be confirmed by

The fault can sometimes be confirmed visually through the clear top.

This image through the top cover shows the motor terminal on the left is good, but the motor terminal on the right is bent upwards and not making good contact with the printed circuit board.



This is how a motor contact that is not making contact can look when the robot is opened (left is bad, right is good):

Repair

Repair by reforming the motor terminal. The terminal can be easily straightened with needle nose pliers. Form and bend the terminal so it appears smooth and slightly rounded up. This will provide good spring contact with the printed circuit board.

See the video guide for disassembly and reassembly of the Edison V3 here: meetedison.com/repair-guide/

Cause of fault

This fault is extremely rare (one in more than 20,000). This fault has not been able to be reproduced through dropping, but this may be the cause.

Prevention of the fault reoccurring

Educate students to treat the robots with care. Regularly falling from height will eventually cause the Edison robot to stop working.

Productions that are most affected

01

Production is indicated by the first two digits of the serial number (e.g. 01-99999 = production 01).

Axle stuck in drive shaft

This is when a wheel has cracked away from the robot, but left the cross axle inside the drive shaft and cannot be removed by hand.

Symptoms

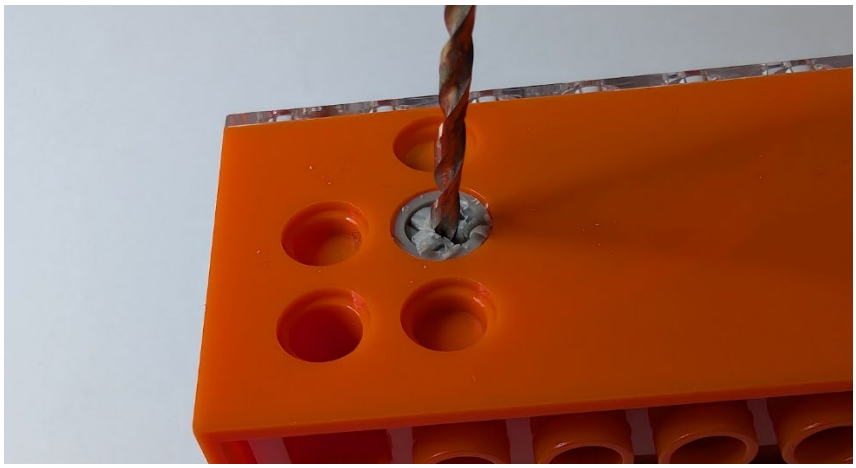
A drive shaft that has a remaining section of a wheel axle that cannot be removed by hand.

Fault can be confirmed by

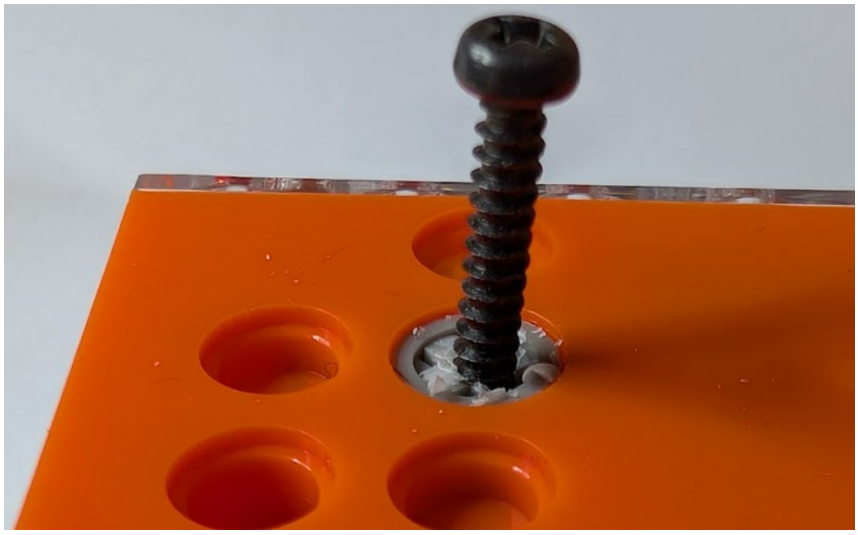
The fault can be confirmed visually as can be seen here.

Repair

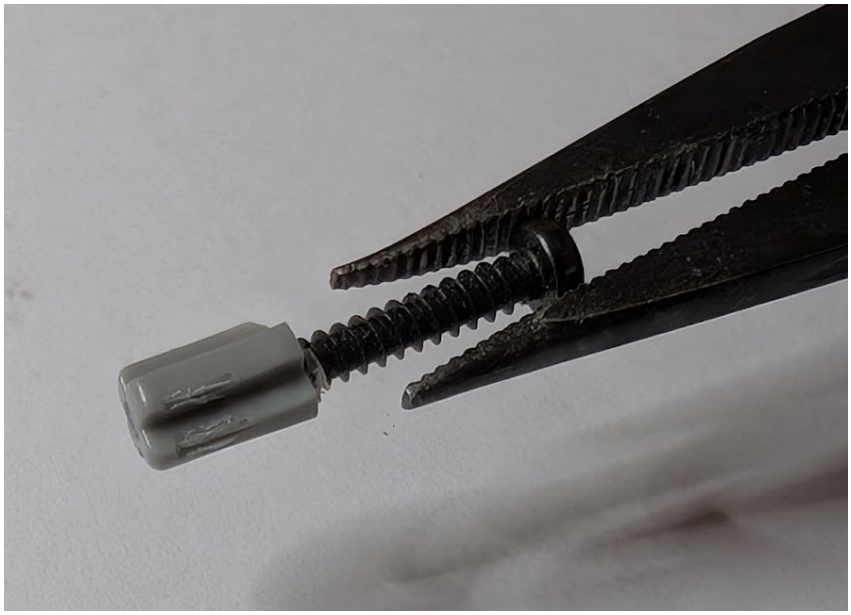
Use a 2mm drill bit to drill a hole into the centre of the cross axle:



Then screw a small screw into the hole anchoring it in. Make sure the screw is large enough to grip, but not so large that it damages the robot's drive shaft:



Now use pliers to remove the screw with the cross axle attached:



Replacement wheels are available in spare part packs here:
https://meetedison.com/shop/

Cause of fault

If the Edison robot is repeatedly (50+ times) dropped from 1 metre or more onto a hard surface, cracking and eventual breaking of the wheel can occur.

Prevention of the fault reoccurring

Educate students to treat the robots with care. Regularly falling from height will eventually cause the Edison robot to stop working.

Productions that are most affected

Any

Production is indicated by the first two digits of the serial number (e.g. 01-99999 = production 01).

Power related faults

The following faults and repair suggestions are related to the Edison V3 robot experiencing trouble powering on or remaining powered on.

Capacitors touching

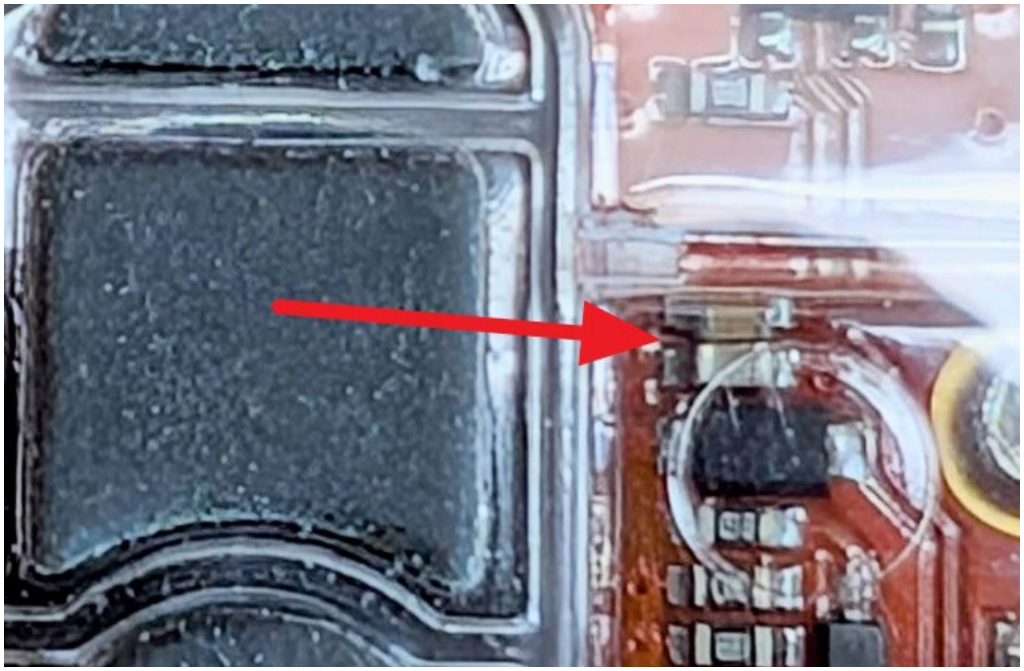
This fault is when two specific capacitors are pushed together and make electrical contact after a heavy impact.

Symptoms

Will not turn on or respond to being plugged in to USB or being placed on the EdCharger.

Fault can be confirmed by

Visually inspect if the two capacitors (C21 and C24) are making contact with each other. This can be seen without disassembling the robot.

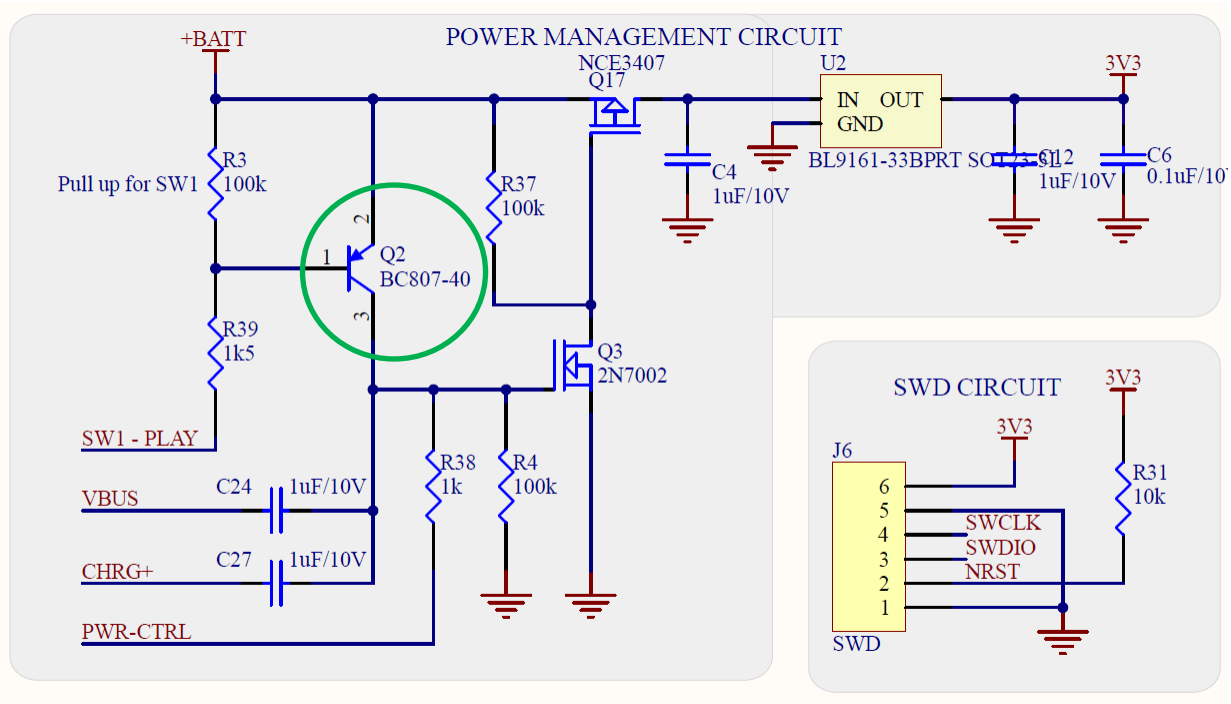


Repair

A video guide for disabling and reassembling the Edison robot can be found here: meetedison.com/repair-guide/
Separate the two capacitors by sliding a blade between them and if required resolder them.

In some cases, a second repair is required. If the robot powers up intermittently (approximately every four hours), then the transistor Q2 (BC807-40) requires replacement. See here for ordering this part https://www.mouser.com/c/?q=BC807-

40. Note that the replacement of this part requires surface mount component soldering. This requires the expertise of a service professional.



Cause of fault

If the robot is repeatedly dropped on a hard surface and lands at the front of the clear top cover, then the rib next to the capacitor gradually pushes it sideways until the failure occurs.

Prevention of the fault reoccurring

Educate students to treat the robots with care. Regularly falling from height will eventually cause the Edison robot to stop working.

Productions that might see this fault

01 to 11

Production is indicated by the first two digits of the serial number (e.g. 01-99999 = production 01).

Locked up battery protection IC

This fault relates to the integrated circuit (IC) chip that protects the battery from overcharge and over discharge by becoming locked into protection mode. This prevents the battery from being charged and discharged and therefore not allowing the Edison V3 to be switched on.

Symptoms

Edison V3 robot will not switch on, indicate charging via USB or EdCharger and will not connect to a programming app via USB.

Fault can be confirmed by

If all of the following conditions are true, then this can be considered the likely fault:

- when plugged into USB port there is no response
- when placed on the EdCharger there is no response
- when pressing the triangle button there is no response

Repair

Leave on charge for 48 hours and test again. This can sometimes recover the robot from this issue (battery protection IC resets).

If the above does not work, then the battery protection IC requires power cycling. To do this:

1. Remove the top cover (four screws)
2. Remove the two screws holding down the printed circuit board
3. Lift the printed circuit board only 5 mm up and leave in that position for 10 minutes
4. Lower the printed circuit board down (ensure that the LED and phototransistor line tracker components re-seat correctly into their positions - check from below the robot
5. Reassemble and test
6. Immediately update the firmware to the latest version via USB from one of the programming apps

A video guide for disabling and reassembling the Edison robot can be found here: meetedison.com/repair-guide/

Update firmware

1. On a PC go to: https://www.edblocksapp.com/v3/
2. From the 'Menu' (top left) select 'Update firmware'
3. Plug the Edison V3 robot in to the USB port
4. Click 'Update firmware'

Cause of fault

The fault is the result of being dropped which causes the battery to rapidly make and break connection with the positive battery terminal. The rapid switching between connected and disconnected causes the battery protection IC to lock into the off (protected) mode.

Prevention of the fault reoccurring

Update firmware to V1.3.3 (August 2025) or higher. This update improves managing sudden loss of power and significantly reduces the likelihood of this fault occurring.

Productions that are most affected

01 to 11 (production 12 onwards was installed with the firmware update)

Production is indicated by the first two digits of the serial number (e.g. 01-99999 = production 01).

Keypad button stuck down

This fault relates to the square button becoming stuck down.

Symptoms

When switching the robot on it switches back off again after 5 seconds and displays unexpected/unusual general behaviour.

Fault can be confirmed by

Visually confirming that the square button is stuck.

Repair
Wiggle the button back and forth until the button pops back up.

Cause of fault
The fault can be caused when the button is repeatedly pressed in the forwards (or sideways) direction. Long finger nails can increase the risk of this if the finger nail slips under the button surroundings.

Prevention of the fault reoccurring
Ensure that the button is pressed downwards rather than sideways.

Productions that are most affected
01 to 08

Production is indicated by the first two digits of the serial number (e.g. 01-99999 = production 01).

Replace battery
This fault occurs as the battery reaches the end of its ability to hold charge.

Symptoms
Battery life is short (e.g. less than 5 minutes of drive time).

Fault can be confirmed by
Charging the Edison V3 robot for five hours and then setting the Edison to drive. If the driving stops within five minutes, then the battery is likely at end of life.

Ensure that the battery is actually charging by checking that when either on the EdCharger or plugged into USB, that both LED lights come on together indicating charging. If this does not happen then review the other causes of power faults.

Repair

Follow the video disassembly and assembly instructions here:
meetedison.com/repair-guide/

Replacement batteries can be ordered via the Meet Edison contact form here:
https://meetedison.com/edison-robot-support/contact-us/

The replacement battery can also be purchase from other suppliers. The battery is a lithium-ion battery model 14500 800mAh (with positive nipple).

Cause of fault

Rechargeable batteries have a finite number of full charge and discharge cycles and do not last forever. The battery supplied in the Edison V3 is specified to provide greater than 2,000 charge/discharge cycles and maintain 80% capacity. To put that in context, after five and a half years of charging and discharging the battery daily, it should still be able to drive Edison for more than 40 minutes of line following.

Note that the Edison V3 robot has an internal battery management system that controls the rate that the battery is charged and prevents overcharging and over discharging.

Prevention of the fault reoccurring

As mentioned above rechargeable batteries are finite in their ability to charge and discharge.

Productions that are most affected

All

Production is indicated by the first two digits of the serial number (e.g. 01-99999 = production 01).

Programming related faults

The following faults and repair suggestions are related to the Edison V3 robot experiencing trouble with being programmed via the USB cable.

Torn USB cable

A torn USB cable is when the internal ribbon (FPCB) cable becomes torn. This breaks one of more of the four conductors connecting the USB plug to the robot.

This generally results in a robot that cannot be programmed or recharged via the USB cable.

Symptoms

Edison cannot be programmed or recharged via the USB cable, but can still be charged by the EdCharger if able to be tested.

Fault can be confirmed by

If any of the following tests are true then the fault could be a torn USB cable:

- Will not recharge via USB, and/or
- LED lights flash left right when connected to USB (will not go solid or indicate charging), and/or
- Can not download a program via USB, and/or
- Apps displays "no compatible devices" when plugged in, and/or
- Firmware will not update as the Edison turns off during update (try repair firmware option first)

Repair

Repair involves replacement of the USB cable. This requires soldering at an experienced level, using a soldering iron with a fine tip and fine solder. This repair should only be completed by a qualified service professional.

See the video guide for disassembly and reassembly of the Edison V3 here: meetedison.com/repair-guide/

Cause of fault

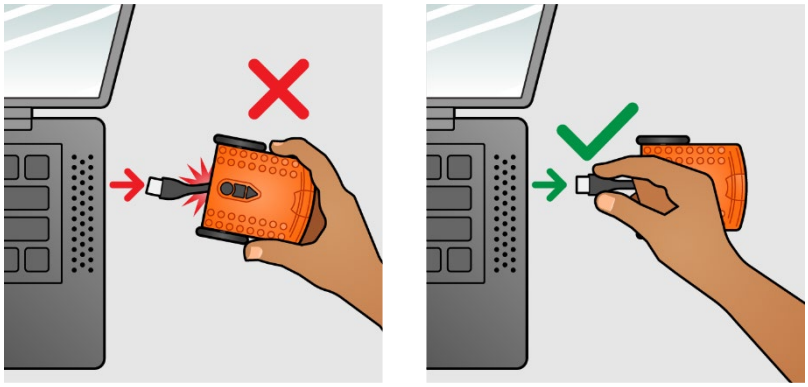
The USB cable can become torn under the following repeated actions:

- Pulling on the Edison's body rather than the USB plug when removing from a USB socket
- Allowing the Edison to hang from a computer's USB socket or when charging via a wall plug
- Using a multiport USB outlet to charge many Edison robots
- Any movement that causes the USB cable to become twisted

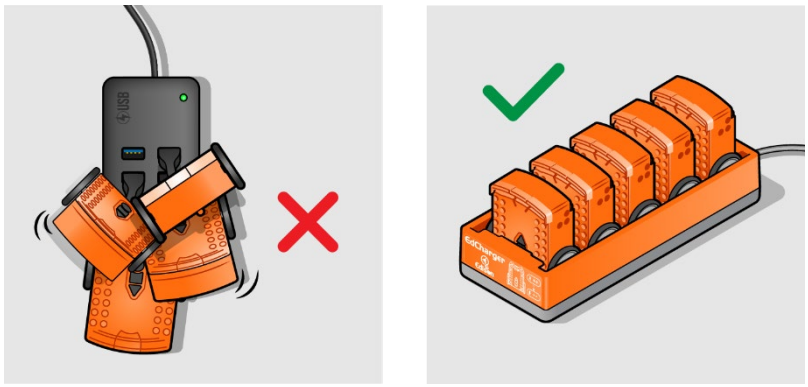
The USB cable can become torn when under repeated loads such as pulling or hanging awkwardly.

Prevention of the fault reoccurring

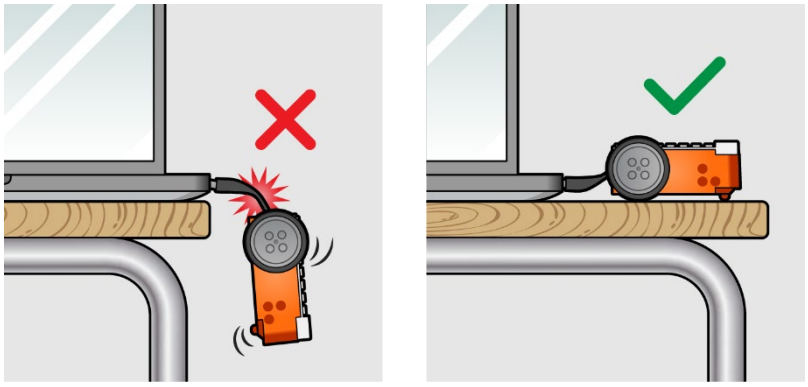
Ensure that the Edison is unplugged from USB by pulling on the USB plug and not the body of the robot.



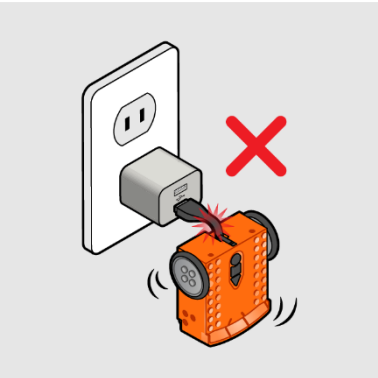
Use the EdCharger to recharge multiple robots.

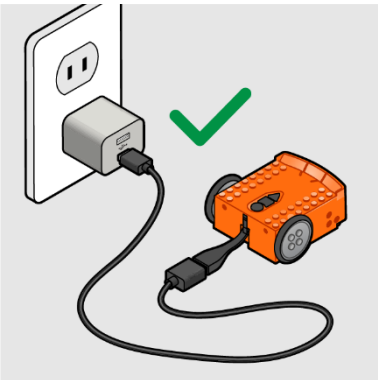


Ensure that Edison is never hanging from a USB port where is risks being twisted or knocked.



When using a wall USB power adaptor, it is recommended that a short USB extension cable is used. This will allow the robot to rest on a stable surface while connected, removing strain from the USB cable.





Productions that are most affected

01 to 07

Production is indicated by the first two digits of the serial number (e.g. 01-99999 = production 01).

Broken USB solder joint

This fault relates to a broken solder joint inside the robot where the USB cable is soldered to the printed circuit board.

Symptoms

This generally results in a robot that cannot be programmed or recharged via the USB cable. Charging via the EdCharger is not affected.

Fault can be confirmed by

If any of the following tests are true then the fault could be a broken USB joint:

- Will not recharge via USB, and/or
- LED lights flash left right when connected to USB (will not go solid or indicate charging), and/or
- Can not download a program via USB, and/or
- Apps displays "no compatible devices" when plugged in, and/or
- Firmware will not update as the Edison turns off during update (try repair firmware option first)

Repair

Repairing a broken USB solder joint requires that the broken joint be identified and reflowed using a soldering iron with a fine point.

See the video guide for disassembly and reassembly of the Edison V3 here:

The broken joint can generally be identified visually once the soldered connection is visible. A broken solder joint will be slightly raised compared to the others. If not,

carefully probe each soldered connection with a pin or other narrow tool to see which one lifts. The one that lifts will require reflowing with solder.

Reflowing the solder joint must be done with a fine point soldering iron and the raised part of the cable should be held down using another tool. This process must be done very carefully as the cable can easily be damaged from too much heat for too much time.

Cause of fault

This can be due to a manufacturing fault and in this case the Edison usually shows signs of failure early in its usage. If this is the case, then the Edison can be replaced under warranty.

If the Edison is older, then the cause could be due to a pulling force on the cable. This can occur if the Edison is removed from USB by pulling on the chassis rather than the USB plug.

Prevention of the fault reoccurring

Avoid exposing the USB cable to sharp forceful pulling and always remove the Edison from the USB port by holding the USB plug, not the Edison's body.

Productions that are most affected

All

Production is indicated by the first two digits of the serial number (e.g. 01-99999 = production 01).

Stuck in bootloader mode

This fault relates to the Edison V3 robot's firmware becoming corrupted due to an interrupted firmware update.

Symptoms

The Edison V3 robot will not accept a program and shuts down when plugged into a computer's USB port.

Fault can be confirmed by

When turning Edison on, if the robot shuts down shortly after being plugged in or shuts down when attempting to download a program or perform a firmware update, then the issue is likely due to corrupt firmware and is stuck in bootloader mode.

Repair

For Edison V3 robots with firmware less than V1.3.0 or bootloader less than 1.2.0 (firmware has not updated since November 2024):

1. Starting with the Edison robot not connected to the computer, open EdBlocks or EdScratch and go into the Menu, and choose 'Diagnostics' then click the 'Repair firmware' button
2. Chrome will then pop up with the connect USB window.
3. At this point, hold down the circle button on the Edison robot and while holding it down, plug the robot USB into the computer (this can be awkward to do, sometimes it takes a few goes). This should get the robot to appear in the list, and be able to proceed with firmware updating.

Note that this process may take five or more attempts before the Edison will connect with the computer.

For Edison V3 robots with firmware greater than V1.3.0 and bootloader equal to or above than 1.2.0 (firmware has been updated after November 2024):

1. Plug the Edison robot into the computer's USB port
2. On one of the programming apps (e.g. edscratchapp.com/v3) go to Menu then Diagnostics and click the Repair firmware button
3. Follow the prompts to update the firmware

Cause of fault

This fault can be caused if a firmware update is interrupted by either being unplugged from the computer during a firmware update or loss of internet connection during a firmware update.

Prevention of the fault reoccurring

Always ensure the Edison robot has completed a firmware update before disconnecting it from the computer.

Productions that are most affected

01 to 06

Production is indicated by the first two digits of the serial number (e.g. 01-99999 = production 01).

Other faults

Miscellaneous faults that do not suit any of the categories above.

Broken off IR LED, red LED or phototransistor

This fault relates to electronic components at the front of the robot that can break away from the printed circuit board due to being repeatedly dropped onto a hard surface.

Symptoms

One of the three symptoms is found:

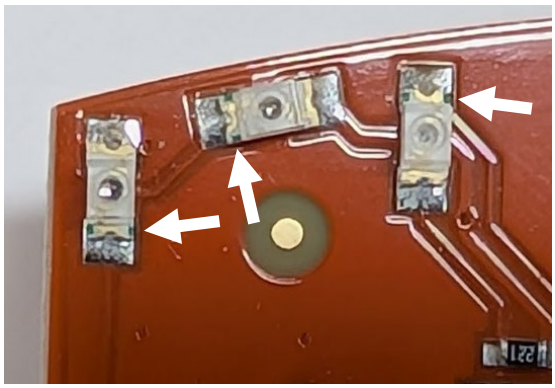
1. One or both red LEDs do not light up
2. Obstacles cannot be detected on one or both sides
3. Light level readings cannot bSe made from one or both sides

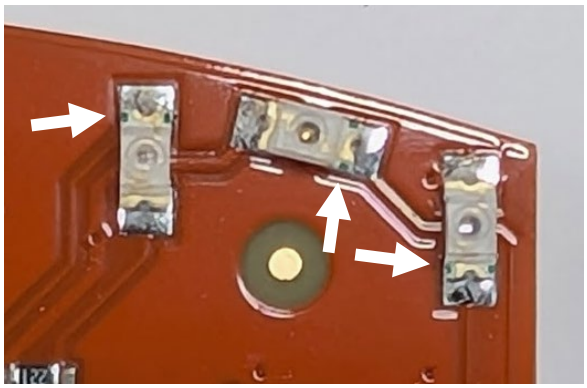
Fault can be confirmed by

The fault can usually be confirmed by looking at the components through the clear top. If one of these components is missing then this fault can be confirmed.

Repair

The broken off component can usually be found inside the robot and requires re-soldering onto the printed circuit board. Note the orientation of the component, indicated by the two very small green squares (indicated by the arrows), when soldering the component.





For the component placement and part numbers, see the circuit diagram and printed circuit board layout towards the end of the document. These components are available from suppliers such as Mouser https://www.mouser.com/ and LCSC https://www.lcsc.com/

Cause of fault

The fault is usually due to the robot falling hard and hitting against the top cover multiple times causing the component to become dislodged.

Prevention of the fault reoccurring

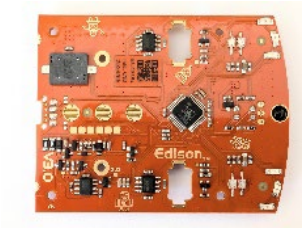
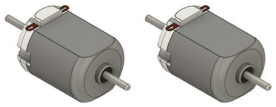
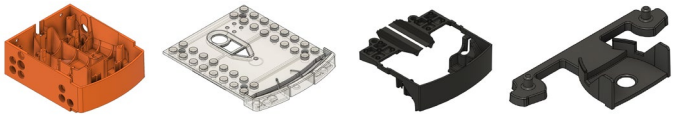
Educate students to treat the robots with care. Regularly falling from height will eventually cause the Edison robot to stop working.

Productions that are most affected

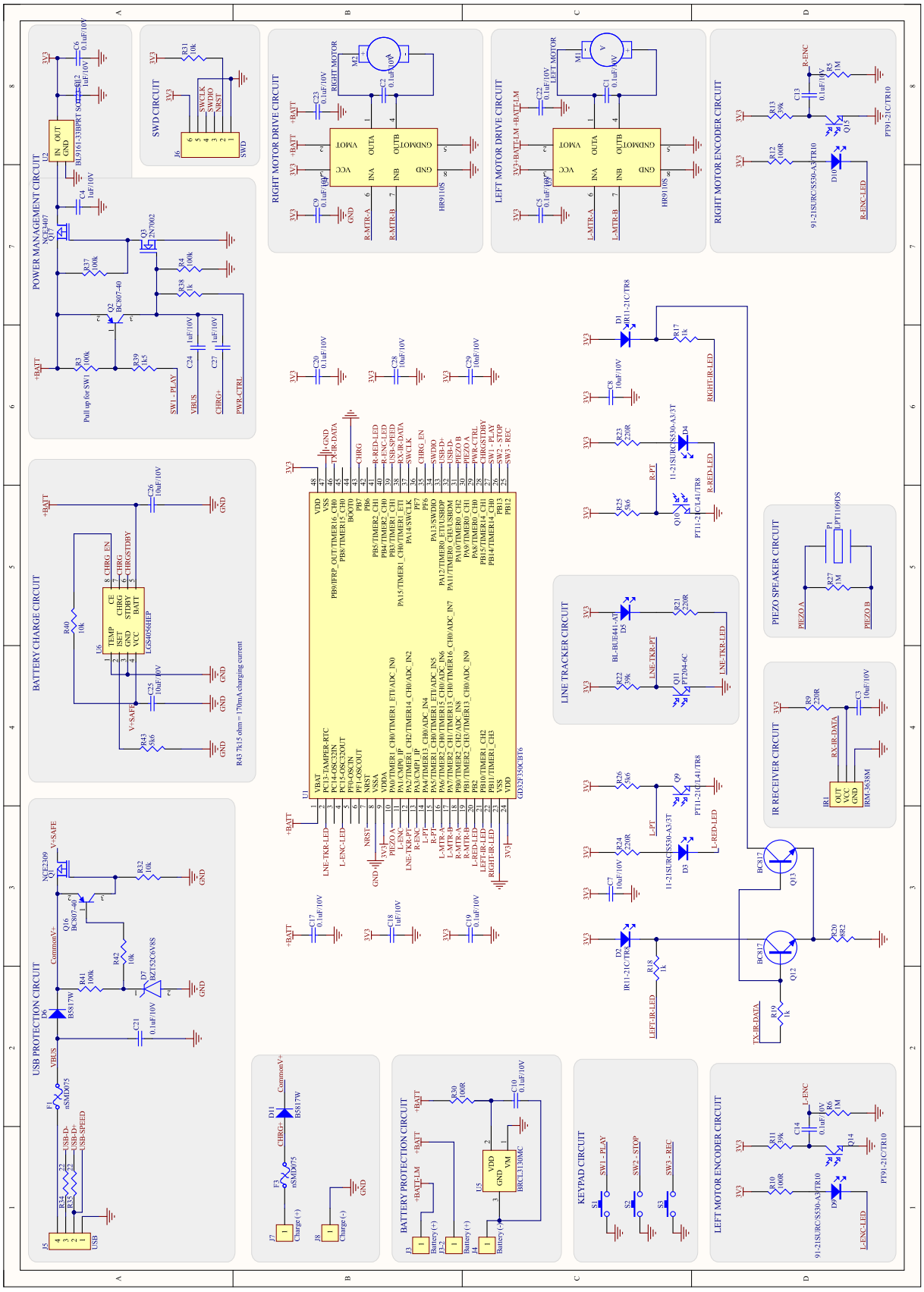
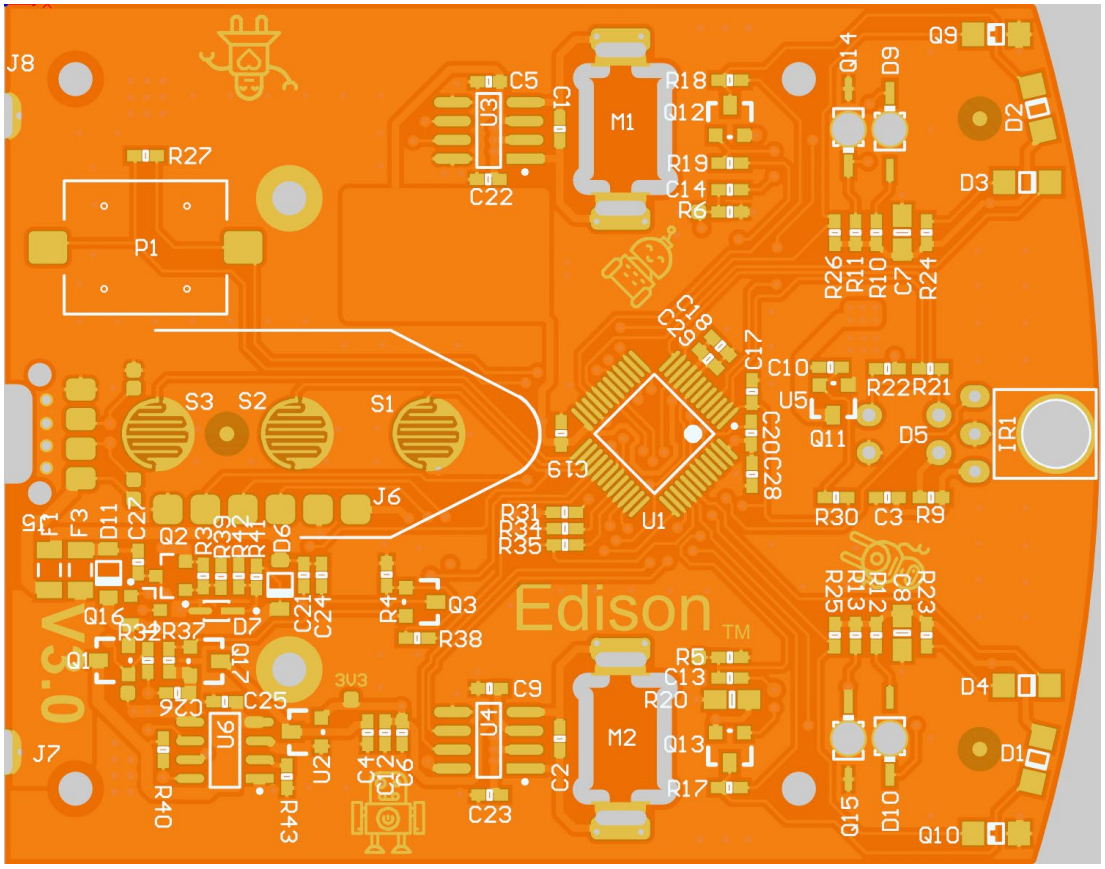
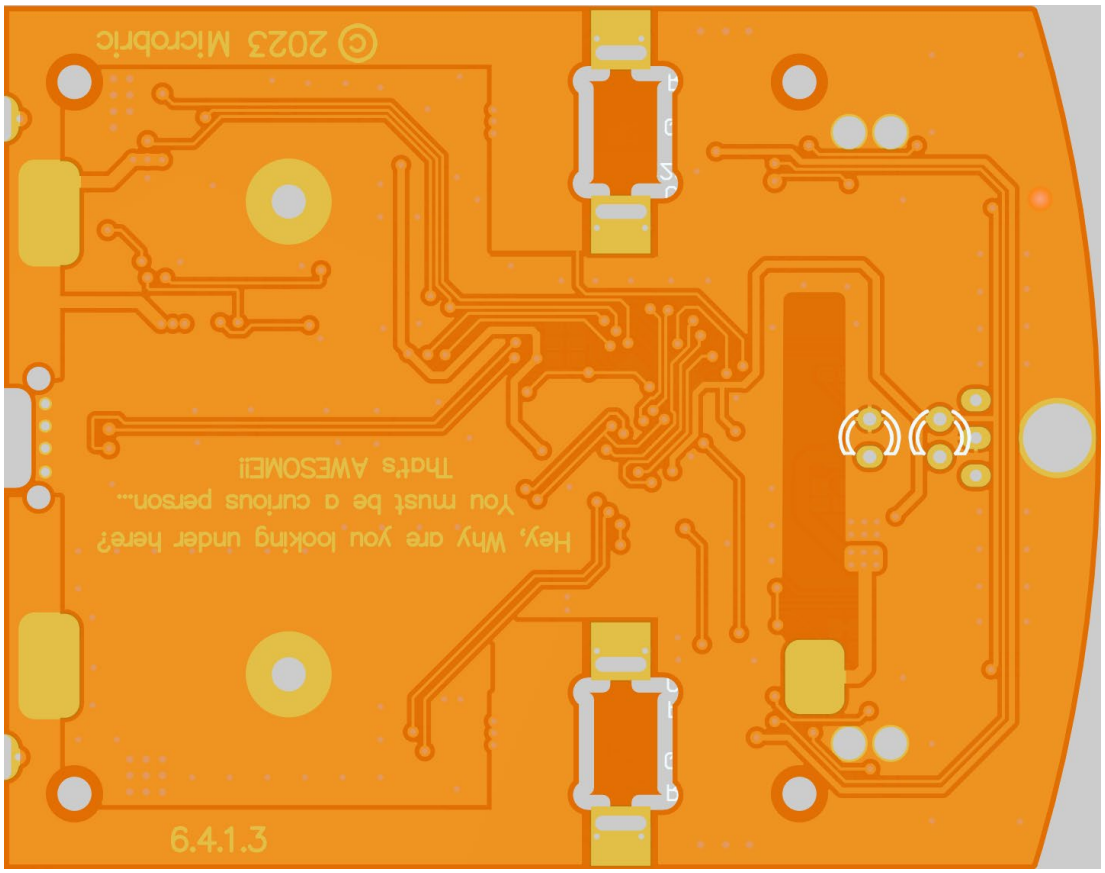
01 to 11

Production is indicated by the first two digits of the serial number (e.g. 01-99999 = production 01).

Replacement parts list

Mainboard pack	
SKU: EDR001SP001	
Contents: 1 x Single mainboard, 1 x IR receiver module (unsoldered), 1 x red 3mm LED (unsoldered), 1 x 3mm phototransistor (unsoldered), USB cable not included	
Motors pack	
SKU: EDR001SP002	
Contents: 2 x Edison V3 motors	
Gears pack	
SKU: EDR001SP003	
Contents: 4 x axle, 4 x crown gear, 4 x worm gear, 4 encoder wheels, 1 x silicone grease satchel	
USB cable and keypad pack	
SKU: EDR001SP004	
Contents: 1 x USB cables, 1 x Keypad	
Screws and springs pack	
SKU: EDR001SP005	
Contents: 2 x positive battery springs, 2 x negative battery springs, 12 x screws (M2.2)	
Plastics pack	
SKU: EDR001SP006	
Contents: 1 x chassis (B13), 1 x top cover (B13), 1 x lower light shield (B13) and 1 x upper light shield	

Circuit diagram



Printed circuit board layout