The AWS Sensor Kit is intended for use only with the AWS DeepRacer.
Getting started guide

Get rolling in approximately 60-90 minutes

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AWS DeepRacer: In the box

1. Vehicle chassis
2. Micro-USB to USB-A cable
3. Pins
4. Compute battery connector cable (USB-C)
5a. Vehicle battery charging adapter
5b. Vehicle battery charging cable
6. Compute battery
7. Vehicle battery unlock cable
8. Vehicle battery
9a. Power cable
9b. Power adapter
10. Vehicle body shell
11. White marking tape (not shown)
Sensor kit: In the box

1. Vehicle body shell
2. LiDAR
3. Camera
4. Pins
5. LiDAR screws
6. USB-A extender cable
7. LiDAR to USB port connector cable
8. Phillips screwdriver
Assembled vehicle at a glance

Cameras
4 MP cameras with MJPEG

Front
- Vehicle chassis
- Power on/off
- SD card slot
- Power button
- Reset button

Back
- LiDAR holder
- Compute battery on/off
- LED light
- Status LEDs

Front
- USB-C
- Micro USB
- HDMI

Back
- Micro USB
- LiDAR
Preparation

Charge batteries
Approximately 2 hours

1. **Charge compute battery**

   Connect the power cable, power adapter and the compute battery. Plug into a power outlet to charge.

   *Note: Press button to power on. Battery indicator LEDs glow when battery is charged or at capacity.*

2. **Charge vehicle battery**

   Connect the vehicle battery charge adapter, the vehicle battery charge cable and the vehicle battery. Plug into an power outlet.

   *Note: Green LED - full charge and ready

   Red and green LED indicates vehicle battery is charging*
Preparation

Gather these items

DeepRacer vehicle
Vehicle battery
Compute battery connector cable
Compute battery

Next: Setup vehicle
Setup your vehicle

1. Unpin and remove vehicle shell

2. Unpin chassis by removing four pins

3. Lift compute module
   Note: wires attached

4. Connect vehicle battery
   Use the red connector cable, the white connector is for charging

Next: Setup vehicle continued
Setup your vehicle

5. Insert vehicle battery in the cradle

6. Secure vehicle battery with velcro strap

7. Turn switch on, then off

Listen for an indicator sound, then switch off
Note: Sound indicates the vehicle battery has charge and everything is working

Next: Install sensors
Setup your vehicle

8. Secure vehicle with four pins
Hold rounded side to insert

9. Secure compute battery and cable velcro strap

Next: Sensor preparation
Preparation

Gather these items

- LiDAR and LiDAR bracket
- LiDAR screws
- LiDAR to USB port connector cable
- Phillips screwdriver
- Camera

Next: Install LiDAR sensor
Install LiDAR sensor

1. Pull out camera from USB port
   Grab the camera module firmly and pull upward to remove it from the USB port.

2. Unplug USB-C cable from compute battery
   Note: Dell battery cable is longer

3. Place LiDAR on vehicle chassis

Next: Install LiDAR sensor continued
Install LiDAR sensor

Fasten LiDAR - front and back

4. Fasten front screw

Note: Use screws from shell bracket

5. Fasten back screw

Next: Install LiDAR sensor continued
Install LiDAR sensor

6. Plug USB-A cable in middle USB-A port

7. Plug the USB Micro-B cable into the LiDAR

Next: Install stereo cameras
Install stereo cameras

Plug camera into the left and right USB-A ports

Next: Connect battery
Connect battery

Connect compute battery with USB-C

Next: Connect Dell battery
Connect Dell battery

*ONLY for customers with a Dell compute battery. If you do not have a Dell compute battery, skip these instructions.

1. Plug cable in Dell compute battery
2. Slide cable under LiDAR frame
3. Wrap cable around base of LiDAR
4. Plug in USB-C

Next: Turn on power
13. Turn on vehicle compute and wait for blue LED

Approximately 2 minute for connection
See LED Tips on pages 30-31 for additional information
Connect to Wi-Fi

Let's get your vehicle connected to a Wi-Fi network and use the vehicle's IP address to drive your vehicle manually and autonomously.

⚠️ If you use macOS Catalina or later (10.15.5 +):

You will need a USB drive the first time you connect your vehicle to Wi-Fi. After you connect and your vehicle's software updates, you can set up connections to new Wi-Fi networks using the USB cable in the box.

[How to use a USB Flash Drive to Connect your AWS DeepRacer](#)

Use a Firefox browser to connect to deepracer.aws or the device's wireless IP (Chrome is not supported).

1. Connect vehicle to computer with micro-USB

![USB Micro B](image)

Next: Connect to WiFi continued
Connect to Wi-Fi

2. Open browser, enter deepracer.aws
Note: Disable Wi-Fi on your computer and disconnect ethernet cable.
Note: Trouble connecting, see Wi-Fi Tips on page 32

3. Proceed with a non-private connection
Select advanced and ‘Proceed to deepracer.aws’ to get to unlock your AWS DeepRacer
Note: Firefox requires a trust certificate, ‘accept and proceed’

4. Turn over vehicle
Vehicle access password is found printed at the bottom of the vehicle.

Next: Connect to WiFi continued
Connect to Wi-Fi

5. Find password and write it down
Write down the password, you will need to use it later.

Note: Some letters in the password might be hard to recognize. Try ‘l/l, o/O/0 and i/l’ if your password doesn’t work.

6. Enter password to control vehicle

Unlock your AWS DeepRacer vehicle

The default AWS DeepRacer password can be found printed on the bottom of your vehicle.

Password

[ ] Show password

Access vehicle

Forgot password [ ]
Turn on vehicle

1. Confirm compute battery is on by checking LED lights

2. Wait for LEDs to light
   Two blue LED lights indicate battery is charged and Wi-Fi connected. See Tips on page 30-31 for LED behavior.

3. Switch on vehicle
   Listen for two short beeps and one long beep

Next: Lights and action!
Lights and action!

Check for visual cues that your sensors are ready: Is your LiDAR spinning? Is its LED lit?
Test Drive

Use any device with a browser to drive your AWS DeepRacer. Connect your device to the same Wi-Fi network as your AWS DeepRacer.

1. Enter vehicle IP address to access your vehicle on an internet browser

   **Note:** This is an example, not your vehicle IP address.

2. Enter password

   **Note:** Found printed on the bottom of your vehicle
Test drive

1. Check the sensors

Look beneath the camera viewfinder to find your sensor connection status. The connection is successful if you see green check marks. The LiDAR view finder is switched off by default. Switch it on to verify that it's connected.

2. Put the vehicle in manual mode

Move the joystick in the forward direction and watch how the vehicle responds. Does the vehicle move in the forward direction?
Test drive

3. Try autonomous mode

1. Choose the **Autonomous driving** mode. Load a sample model using the drop down and load your own trained model.

2. Press **Start vehicle** button

3. Gradually increase the **Maximum speed %** until model begins to move

Optimizing a trained model for transfer to a physical AWS DeepRacer vehicle can be a challenging learning process. It requires iterations through trial and error.

For more tips, see **Optimize Training AWS DeepRacer Models for Real Environments**

Next: Drive and experiment
Drive and experiment

Train reinforcement learning (RL) models
Train your own RL models and watch training in simulation. Evaluate models and download models to your AWS DeepRacer to test on tracks.

Visit https://www.aws.amazon.com/deepracer

When loading models on your vehicle make sure the sensor configurations match. Models trained with LiDAR and stereo camera need to run on vehicles with LiDAR and stereo camera.

Next: Track building
Track building

Build a straight track

Build a straight track segment to experiment with pre-loaded reinforcement learning (RL) sample_model. The model has been optimized to stay within boundaries.

Track design templates

1. Lay down tape on one border of the straight line. Length varies on available space.
2. Measure a width of approx. 24”, excluding tape borders. Lay down a parallel line and match the length.
3. Place the vehicle and watch your vehicle begin its Machine Learning journey.

Next: Race
Race

Join the DeepRacer League
Welcome to the world’s first global autonomous racing league, open to anyone.

**Summit Circuit: Find a Race**

Join the community
- DeepRacer forum
- DeepRacer Slack channel
- DeepRacer Github issues
- DeepRacer documentation
Tips
Battery level and recharging

Compute battery charge
Press the power button to turn on/off.
Note: LED represents battery level

Charge compute battery
Connect charger and charger cable to an outlet.

USB-C
Tips

Battery level and recharging

**Vehicle battery**
Use the cable with white connector end and insert in vehicle battery charger.

**Green/Red LEDs - charge required**
- **Green**: fully charged battery
- **Red**: battery needs recharging

Battery troubleshooting

**Check 1. Ensure battery is fully charged**
Green only LED indicates a fully charged vehicle battery

**Check 2. Check vehicle power switch**
Turn the vehicle switch on by moving the button away from the wheels. Listen for an indicator sound (two short beeps, and one long beep if the compute is on) confirming the vehicle is ready.

**Check 3. Drive your vehicle**
Connect your vehicle to Wi-Fi, enter vehicle IP address on a browser (Firefox with MacOS Catalina users) and manually drive with the joystick.

If the problem persists, contact AWSDeepRacer-Help@amazon.com.

Note: When not using the DeepRacer, please make sure the vehicle is either turned off or the battery disconnected.
Tips

Understanding LED behavior

**Battery LED Guide**

- **Solid blue**: Battery charged, application running
- **Blinking blue**: updating software
- **Yellow**: Device booted to OS
- **Blinking Yellow**: Loading BIOS and OS
- **Red**: Error in system when rebooting or starting application
Tips

Understanding LED behavior

Wi-Fi LED Guide

- **Solid blue**: Wi-Fi connected
- **Blinking blue**: Connecting to Wi-Fi
- **Solid red then off**: Failed to connect to Wi-Fi

Troubleshooting

- Check your Wi-Fi network password
- Public Wi-Fi that requires CAPTCHA-enabled sign-in commonly found in hotels, gyms, and cafes is not supported
Tips

Wi-Fi connection troubleshooting
Having trouble connecting, try these tips

**Step 1. Wait, the application may take up to 2 minutes to be ready**
If waiting doesn't work, then try step 2

**Step 2. Turn off/disable computer's Wi-Fi and unplug ethernet connections**
If disabling the Wi-Fi doesn't work, then try step 3

**3. Push the reset button and wait for blue battery LED**
Once the LED turns solid blue, refresh the deepracer.aws page. If it doesn't work, then try step 4.

**4. Visit advanced troubleshooting**
[https://docs.aws.amazon.com/deepracer/latest/developerguide/deepracer-troubleshooting.html](https://docs.aws.amazon.com/deepracer/latest/developerguide/deepracer-troubleshooting.html)