# AUTO4508 Project User Manual

## Setting up:

**(1) Connect DualShock 3 Clone**

First, plug the USB Bluetooth Dongle into the robot’s USB port. Using the Bluetooth GUI in settings on the robot’s PC, connect the controller.

\*Add more detailed explanation\*

**(2) Set up networking**

Firstly, connect the robot and your laptop to the same wi-fi network using the GUI.

Find the robot’s and your IP either using the GUI or by running



**(3) Run main ROS nodes on robot using SSH or on robot directly**



This ensures the robot will still have its base functionalities (movement, controller operation) working if the external laptop disconnects

**(4) Configure external laptop for running graphically intensive ROS nodes**

The robots have limited processing capacity, so it is better to run more intensive tasks on external devices such as a laptop. Run the following commands in a new terminal not connected to the robot via ssh



Also depending on your network settings (such as in a virtual machine) this may not work fully, and the host file needs to be edited.



**(5) Launch Rviz on external laptop in the terminal connected to ROS master**

This allows you to see the current location of the robot, any obstacles it has detected, and its intended path.



**(6) Control robot manually using DualShock III clone**

Hold down right trigger 1 and use the left analogue stick with traditional movement controls. Only certain robots will allow driving backwards, but all robots allow rotating in one spot and can move straight or on a curved path.

**(7) Launch the Waypoints using SSH**



The robot should then go towards each waypoint in order.

## Troubleshooting:

**Issue: Robot will not connect to controller**

**Solution:**

1. Check that Bluetooth is working and enabled on the robot.
2. Try unplugging the Bluetooth dongle and restart the Bluetooth module
3. Check that the controller is paired with the robot. If it is not paired, connect the controller via usb and select allow pairing when prompted
4. Check that controller is fully charged

**Issue: Error “is neither a launch file in package nor is a launch file name” when using roslaunch**

**Solution:**

1. Make sure that you have sourced devel/setup.bash
2. If problem persists, check that the package is installed by running:

rospack find <name of package>

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1. If package is not installed, try installing the package. Installation information can typically be found by googling the name of the package and following the instructions on the ROS wiki
2. Try installing the full ros-noetic package to ensure no dependencies are missing:

sudo apt install ros-noetic-desktop-full

**Issue: Robot is beeping**

**Solution:**

1. Try pressing the reset button on the robot
2. If beeping continues, then robot is low battery. Put on charge

**Issue: Robot won’t drive towards waypoint**

**Solution:**

1. Check that move\_base has been launched with the following command

rosnode info move\_base

1. Check that a GPS signal has been received with the following command [note the latitude and longitude should not be “nan”]:

rostopic echo fix

**Issue: No data is displayed in Rviz on the external device**

**Solution:**

1. Add the local device and robot’s IP to the host file

**Issue: Laserscan is not displayed in Rviz**

**Solution:**

1. Make sure camera is plugged in
2. Check camera is working. This can be done by launching the following and checking images are shown in rviz:

roslaunch depthai\_examples stereo\_node.launch

1. If problem persists, try rebooting the system

**Issue: No output from GPS**

**Solution:**

1. GPS signal may take a few minutes to register. Move the robot into a clear open space and wait up to 5 minutes

**Issue: Error: “Timed out waiting for transform from base\_link to robot\_pose\_ekf/odom\_combined to be available before running costmap”**

**Solution:**

1. Check that the topic robot\_pose\_ekf/odom\_combined has odometry published:

rostopic echo robot\_pose\_ekf/odom\_combined

1. If no odometry is being published, it is likely that no GPS data has been received yet. Check GPS is receiving data with the following command:

rostopic echo fix