

# User Manual

## for Path Following Vehicle Android Application

### Getting started

#### Installing the application

Download the APK directly to the Android device, or transfer it from a computer over USB. When the APK is on the device, use a file manager application to find the file and install the application on your phone.

#### Setting up

Make sure the Android device is paired with the vehicle. Do this by accessing the Bluetooth settings on your phone. Make sure that Bluetooth is enabled and the vehicle is turned on. Find the vehicle in the list of available Bluetooth devices, and pair it with the Android device by selecting it.

Open PathCar. The application always starts in path mode (see below). To connect the application to the vehicle, tap 'CONNECT'.

#### Path mode

The application always starts in path mode. A path can be drawn directly on the screen with a finger or a stylus. When a Bluetooth connection is established and a satisfactory path has been drawn, tap 'SEND' to send instructions to the vehicle.

The path is drawn from the perspective of the vehicle, and thus the first move executed in path mode will always be forward. If the physical space does not allow for this, swapping to manual mode might be necessary, see "Manual mode".

#### Delete existing path

To delete an existing path, tap the drawing area once. Unless the existing path covers a significant area of the screen, it is not necessary to delete the old path before drawing a new one. When a new path is drawn, the old path will be discarded.

#### Path correction

A drawn path can be corrected from a certain point, unless 'Sensitivity of line modification' is turned off (see "Settings"). Place a finger or stylus close to the

existing path (how close can be determined in the settings, see "Sensitivity of line modification"), and draw the desired path from that point. The unused part of the path will be discarded in favor of the new one.

### Auto-loop

If the starting point and the ending point of a path is close together, the application can be made to connect these points and create a loop, causing the vehicle to return to its starting point. To disable this function, see "Sensitivity of auto-loop" under "Settings".

### Obstacle detection

If an obstacle is detected while the vehicle is following a path, the vehicle will stop and the part of the path where the obstacle was detected will flash red on the screen. When the obstacle has been removed, draw a new path. Alternatively, swap to manual mode to navigate the vehicle around the obstacle (see "Manual mode").

## Manual mode

Swap to manual mode by tapping 'MANUAL MODE'. Note that the vehicle has to be connected for this to work. The mode can be swapped back any time by tapping 'PATH MODE'.

Navigate the vehicle by moving the digital joystick. Controls:

UP = move forward

DOWN = move backward

LEFT = rotate left

RIGHT = rotate right

## Settings

To enter the settings menu, tap the menu icon (three vertical dots in the top right corner of the application) and tap 'Settings'. To exit the settings menu, use the back button of the device.

### Simplification sensitivity

This setting determines how much the application simplifies the drawn path, if at all. The simplification sensitivity is initially set to 'Low', and can be changed to 'High' or turned off completely.

### Sensitivity of auto-loop

This setting determines how close together the starting point and the ending point of a path need to be in order for the path to be set to a loop. The sensitivity can be

set to 'Low', 'High', or turned off completely (in which case the path will never be set to a loop).

### Sensitivity of line modification

This setting determines how close to the existing path a finger or a stylus has to be placed in order to modify the path. The sensitivity can be set to 'Low', 'High', or turned off completely. In the last case, the old path will always be discarded once a new path is being drawn.

### Scale of driving area

This setting determines how wide the physical driving area is in correlation to the screen of the device. The width is set in centimeters, and the application calculates height based on that measurement and the screen area.

### Background

To navigate the car with more precision, a background (such as a map or a blueprint) can be set to represent the physical driving area.

#### Select a background image

Tap the 'CHOOSE' button to open an image stored on the device. The image will be set as a background in path mode.

#### Reset background

Tap the 'RESET' button to clear the background.