

# Controllers

This page is for describing how to use the manual controllers we have for the sub.

## Joystick

This is composed of two programs, `joystick_driver` and `joystick_control`. The `joystick_driver` reads the joystick and publishes the joystick's state to a topic, while `joystick_control` subscribes to this topic and publishes control messages.

Forward/back and left/right cause the sub to move forward/back, left/right as expected. Twisting the joystick controls the sub's yaw. The hat affects pitch and roll, while pulling the trigger resets the sub to a neutral orientation. The throttle is used for controlling the depth of the sub, with the min and max depths are controlled by settings in the parameter server.

## Gamepad

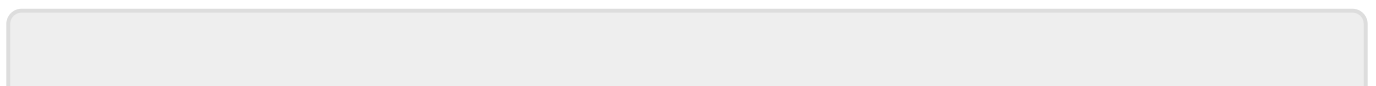
This is composed of two programs, `gamepad_driver` and `gamepad_control`. The `gamepad_driver` reads the gamepad and publishes the gamepad's state to a topic, while `gamepad_control` subscribes to this topic and publishes control messages.

Forward/back and left/right on the left stick cause the sub to move forward/back, left/right. Left/right on the left stick controls the sub's yaw. The d-pad affects pitch and roll, while pressing the 'A' or 'X' button resets the sub to a neutral orientation. The triggers are used for controlling the depth of the sub. Unlike the Joystick, there are no min/max depth settings. The right trigger dives while the left trigger rises. The relative depth change is computed with the difference between the two triggers so there is no harm in pulling both triggers at the same time.

## Keyboard

The keyboard controller has two methods for controlling the sub. The first is through `qweasdzc` control. `q/e` control the yaw of the sub. `wasd` control linear movements in the x-y plane. `z/c` control the dive.

The second control method is the arrow keys and some other keys. The Arrow keys control the linear movement of the sub in the x-y plane. Using the arrow keys with the Ctrl key pressed control the pitch and yaw rotations. `Pg-Up/Pg-Dn` control the dive of the sub.



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