Embedded

Bolinho uses a microcontroller esp32-s3 for controlling the hardware.

For more info check the Granulado repository.

Serial communication

The microcontroller communicates via serial to the host, and is responsible for reading the load cell and controlling the stepper motor.

This communication is done via interrogation, so that the host **prompts** the peripheral for data and it complies.

Protocol:

These are the available commands for the communication between the host and the peripheral.

A instruction is divided in three parts:

`command` `data` `\n`

- `command` is a **1 byte** `character`.
- `data` is the payload as a `string` it can be also empty.
- `\n` is the **line terminator** to identify the end of an instruction.

Bolinho -> Granulado

- `p` -> Ping
- `m[str]` -> Moves stepper motor x millimeters.

  str is an `int` in `string` format.
- `s` -> Stop
- `t` -> Move to top
- `g` -> Get motor position millimeters.
- `r` -> Get instantaneous reading.
- `@` -> Tare load cell
- `w` -> Calibrate known weight
- `x[str]` -> Set known weight

str is an `int` with the weight in `grams` in `string` format.

- `y[str]` -> Set z-axis length

  str is an `int` with the length of the z-axis in `millimeters` in `string` format.

- `j` -> Get z-axis length
- `d` -> Get delta load
- `l[str]` -> Set max load

  str is an `int` with the maximum experiment load in `grams` in `string` format.

- `v[str]` -> Set max travel

  str is an `int` with the maximum experiment travel in `mm` in `string` format.

- `a[str]` -> Set max delta load

  str is an `int` with the maximum experiment delta load in `grams / second` in `string` format.

- `e[str]` -> Set motor speed

  str is an `int` with the maximum experiment travel in `RPM` in `string` format.

- `-` -> Nothing

Granulado -> Bolinho

- `p` -> Ping Response
- `e[str]` -> Erro.

  str is an `string` with the description of the error.

- `r[str]` -> Returns current reading

  str is an `int` in `grams` in `string` format.

- `g[str]` -> Returns current position in millimeters

  str is an `int` in `string` format.

- `j[str]` -> Returns z-axis length

  str is an `int` in `string` format.

- `b` -> Bottom interrupt was triggered
- `t` -> Top interrupt was triggered
- `d[str]` -> Returns delta load

  str is an `int` in `string` format.

- `s` -> Response to the stop command
- `i[str]` -> Debug info

  str is any `string` to be shown on the terminal.