Contents

RS485 Interface Commands and Documentation

Context

Board

This interface is intended, and only compatible with, the custom 410_LACEP revision of the VESC Controller.

Parameters

The interface consists of an RS485 physical layer, using one differential pair. The data is transferred on a half-duplex serial UART running at **115200 baud**.

Command Structure

Each command consists of the *controller_id* a *command_name* and an optional sequence of *args* separated by *whitespace* and **wrapped with two *newline*** (\n...\n).

\n<controller_id> <command_name> <args>\n

All commands return a *response* terminated by a single newline (\n).

<response>\n

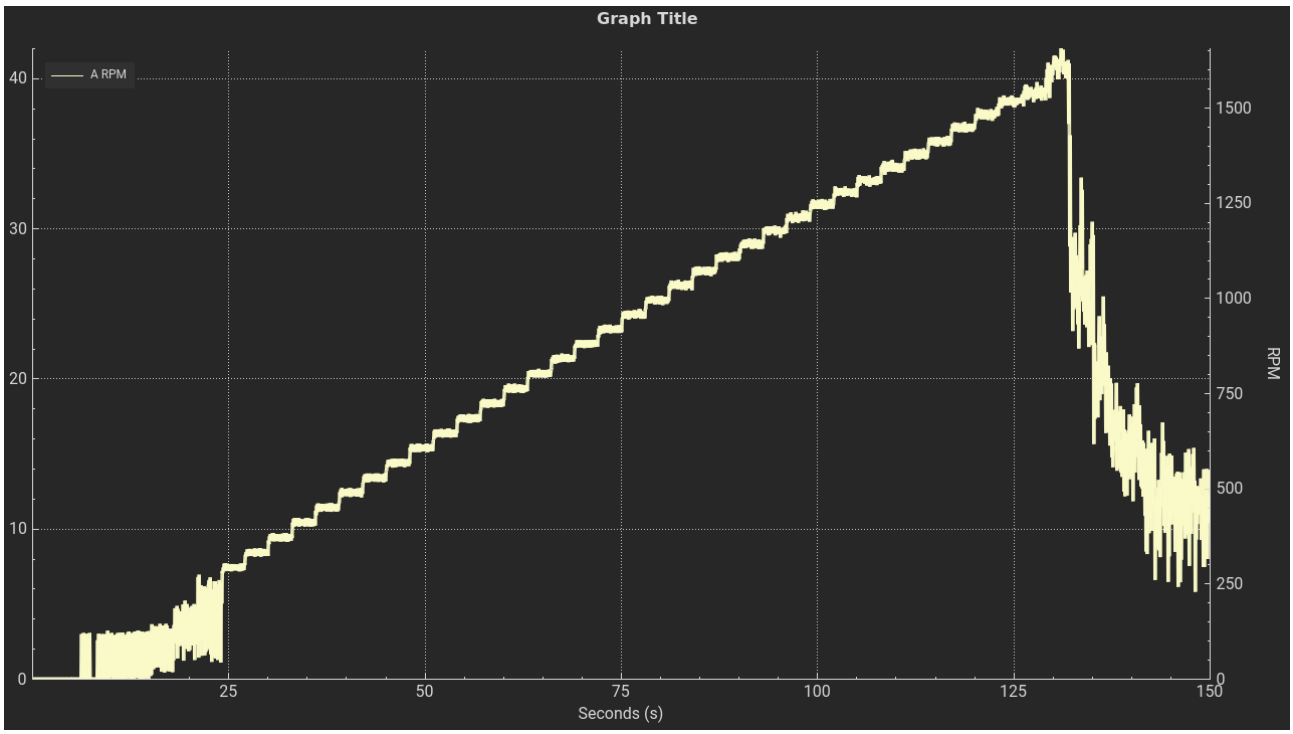
Some *command_names* are available in short form (the first letter).

In case a command does not match any on the list a error *response* will be returned CMD_NOT_FOUND.

Checkout the test.py file to see examples directly.

Limitations

Preliminary tests have encountered problems running the board on the extremes of the possible range of control. The following figure is the plot of a ”VESC Motor Experiment” sweeping the duty cycle from 0% to 100%.



The x-axis is correlated with the duty cycle. The duty cycle is incremented by 2% every 3 seconds. So the start of the usable band is at around 24s, divide by 3, so 8 steps totalling 16%. The upper limit is also identified at 84%. **So the usable duty cycle range is from 16%-84%**.

Command List

Duty Cycle Control

Set Duty Cycle with Ramp

- Usage: <id> duty <setpoint> <rate>
- Short form: d
- Ramps up/down the motor duty cycle at rate %/s with a timestep of 5 milliseconds.
- Response: Expected time to setpoint in seconds
- Example: 0 duty 0.3 0.6 returns 0.500

Encoder

Read Encoder Count

- Usage: <id> encoder
- Short form: e
- Gets current encoder position in degrees
- Response: 216.40

Reset Encoder Count

- Usage: <id> reset_encoder
- Short form: r
- Rests current encoder count.
- Response: 0

Temperature

Read Temperature Sensors

- Usage: <id> temp
- Short form: t

- Returns current temperature of motor and MOSFET in degree Celsius, separated by a comma.

Read Motor Temperature Sensor

- Usage: <id> temp_motor
- Returns only the motor temperature in degree Celsius.

Read MOSFET Temperature Sensor

- Usage: <id> temp_mosfet
- Returns only the MOSFET temperature in degree Celsius.

RPM Speed Control

Set RPM Speed

- Usage: <id> rpm <setpoint> <rate>
- Alternative: <id> speed <setpoint> <rate>
- Ramps up/down the motor duty cycle at rate rad/s^2 with a timestep of 5 milliseconds.
- Response: Expected time to setpoint in seconds
- NOTE: The RPM Control loop is also subject to a limited usable range and throughout testing it was less than the duty cycle control. So **this interface is not recommended**