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 a *command_name* and an optional sequence of *args* separated by *whitespace* and terminated with a *newline* (\n).

<command_name> <args>\n

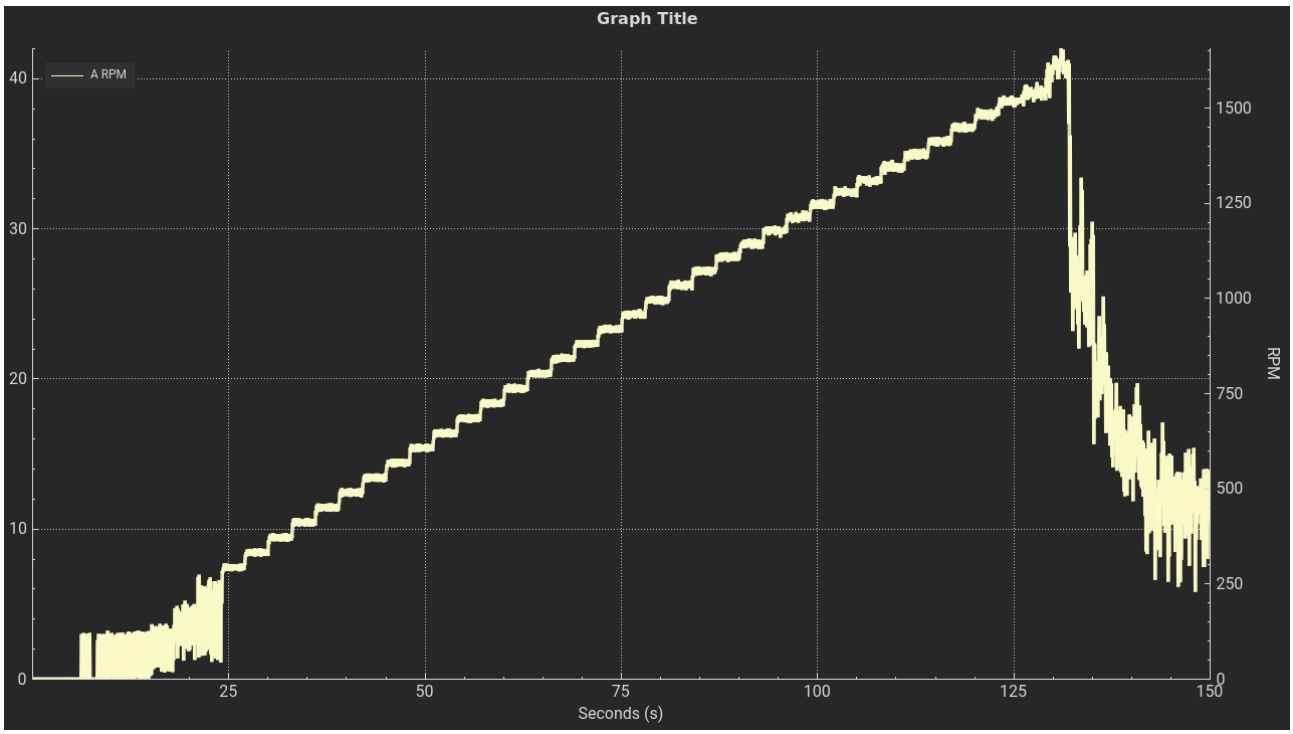
All commands return a *response* terminated by a carriage-return and newline (\r\n).

<response>\r\n

Upper/lower case is irrelevant. In case a command (\n), does not match any on the list a error *response* will be returned CMD_NOT_FOUND.

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

Encoder

Read Encoder Count

- Usage: encoder
- Gets current encoder position in degrees
- Response: 216.40

Reset Encoder Count

- Usage: reset_encoder
- Rests current encoder count.
- Response: 0

Temperature

Read Temperature Sensors

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

Read Motor Temperature Sensor

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

Read MOSFET Temperature Sensor

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

RPM Speed Control

Set RPM Speed

- Usage: rpm <setpoint> <rate>
- Alternative: 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**