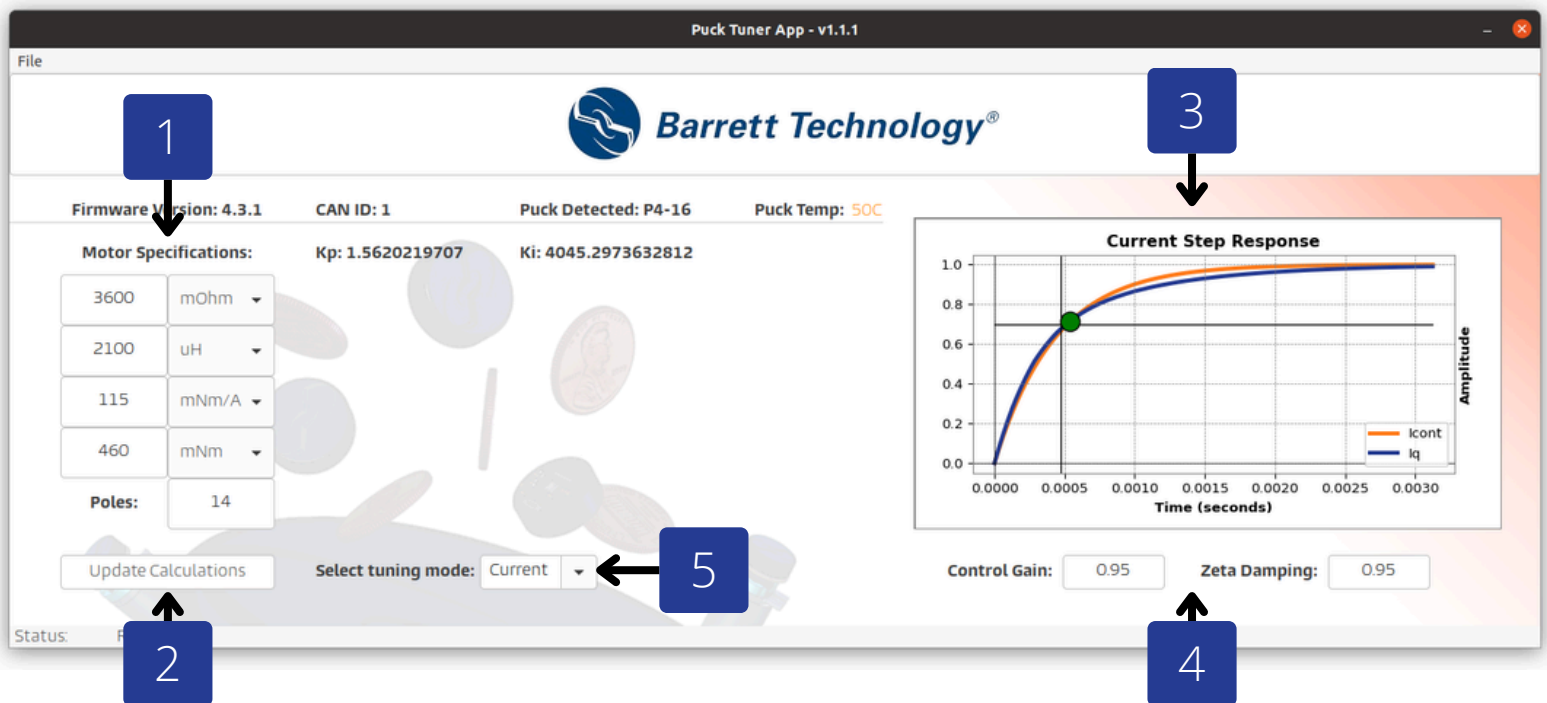




Puck Tuning App Guide

Follow this guide to navigate the Puck Tuner App with ease. Follow page by page for full tuning procedure. For help troubleshooting common issues, view page 5.



PUCK TUNER APP

Motor Tuning Procedure - Current Step Response

- 1 Motor Specifications** - Start by entering correct motor parameters from the motor datasheet.
Note: Motor specifications are crucial for a Pucks motor commutation. Incorrect parameters can damage the Puck / Motor assembly.
- 2 Update Calculations** - Once all parameters are complete, press here to calculate current gains.
Note: For new configurations, this button will turn orange, indicating calculations must be completed prior to continuing the tuning procedure.
- 3 Current Step Response Graph** - Verify I_q closely matches the response time of I_{cont} in the graph.
Note: If the graph is significantly different than the example above, this may indicate an issue with the motor parameter inputs. A red circle indicates the current gains may not be optimal. Try to aim for the top right quadrant for optimal performance (green circle).
- 4 Control Parameters** - Adjust control gain / zeta damping to fit the curve.
Note: Control gain must be greater than 0.
Zeta damping must be greater than 0, but less than 5.
- 5 Select Tuning Mode** - Once current step response tuning is complete, select velocity.
Note: Tuning Mode selection is locked until current response is complete.

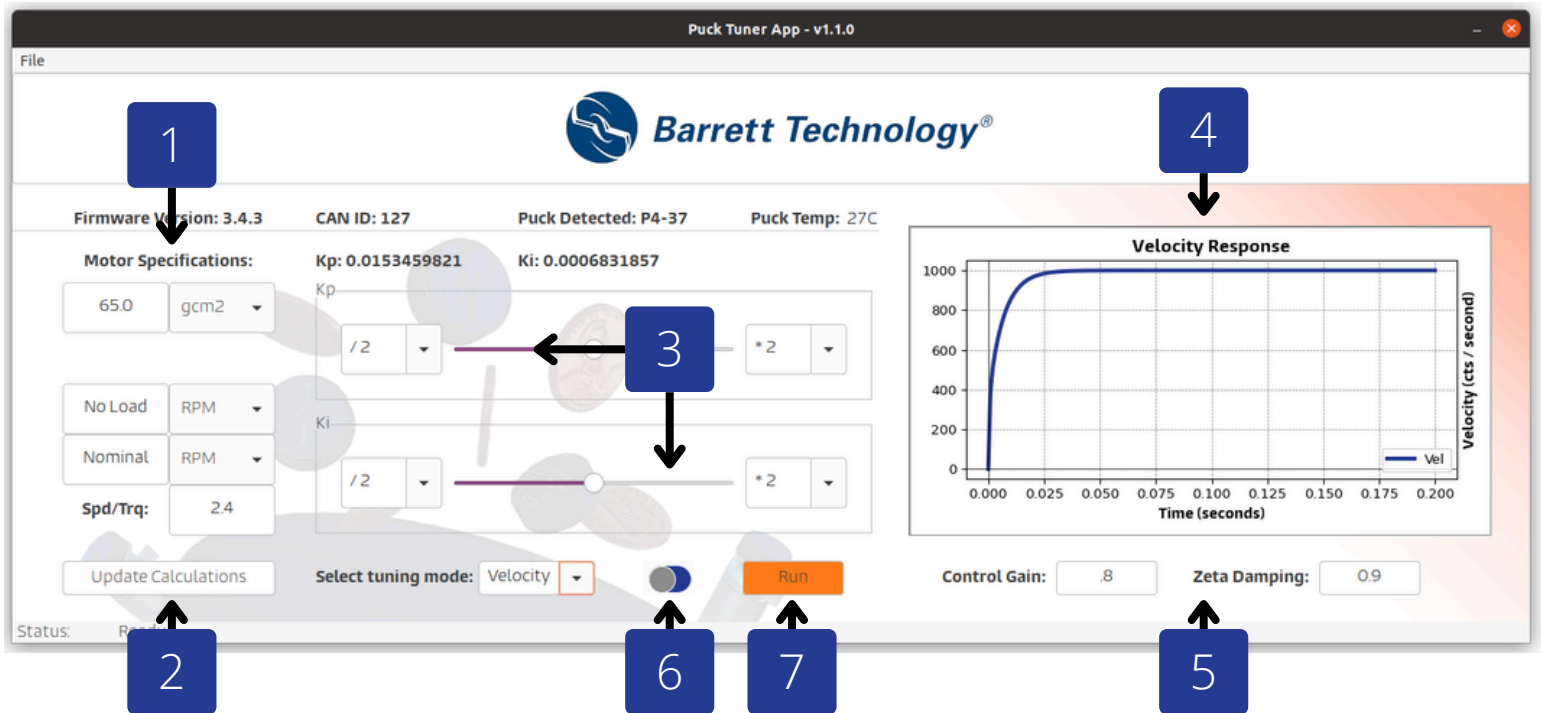
Velocity Response





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Motor Tuning Procedure - Velocity Response

- 1 Motor Specifications** - Enter inertial parameters for the motor from the motor datasheet.
Note: If no speed / torque gradient is provided, input no load and nominal motor speed in the input boxes.
- 2 Update Calculations** - Once all parameters are complete, press here to calculate velocity gains.
Note: For new configurations, this button will turn orange, indicating calculations must be completed prior to continuing the tuning procedure.
- 3 Kp / Ki Slider** - After calculating gains, adjust the slider to fine tune gains for smooth output.
Note: Use the adjustable multipliers to increase / decrease the range of the sliders for fine / coarse adjustments.
- 4 Velocity Response Graph** - Verify the velocity response curve on the graph.
Note: Quick response is important, but balancing a smooth curve with fast response time will provide optimal results.

- 5 Control Parameters** - Adjust parameters to optimize response / alter live graph output.
Note: Control parameters change based on Graph Mode. Adjust the window dimensions to control the response / graph.
- 6 Graph Mode** - Switch between response curve and live velocity output with this switch.
Note: Run the motor in velocity mode and monitor the output velocity at various speeds to fine tune the Kp / Ki sliders for optimal performance.
- 7 Run** - Press Run to enable the Puck in velocity mode for final adjustments.
Note: The Puck will hold 0 velocity in response mode. With Live Graph Mode enabled, the output velocity is adjustable.

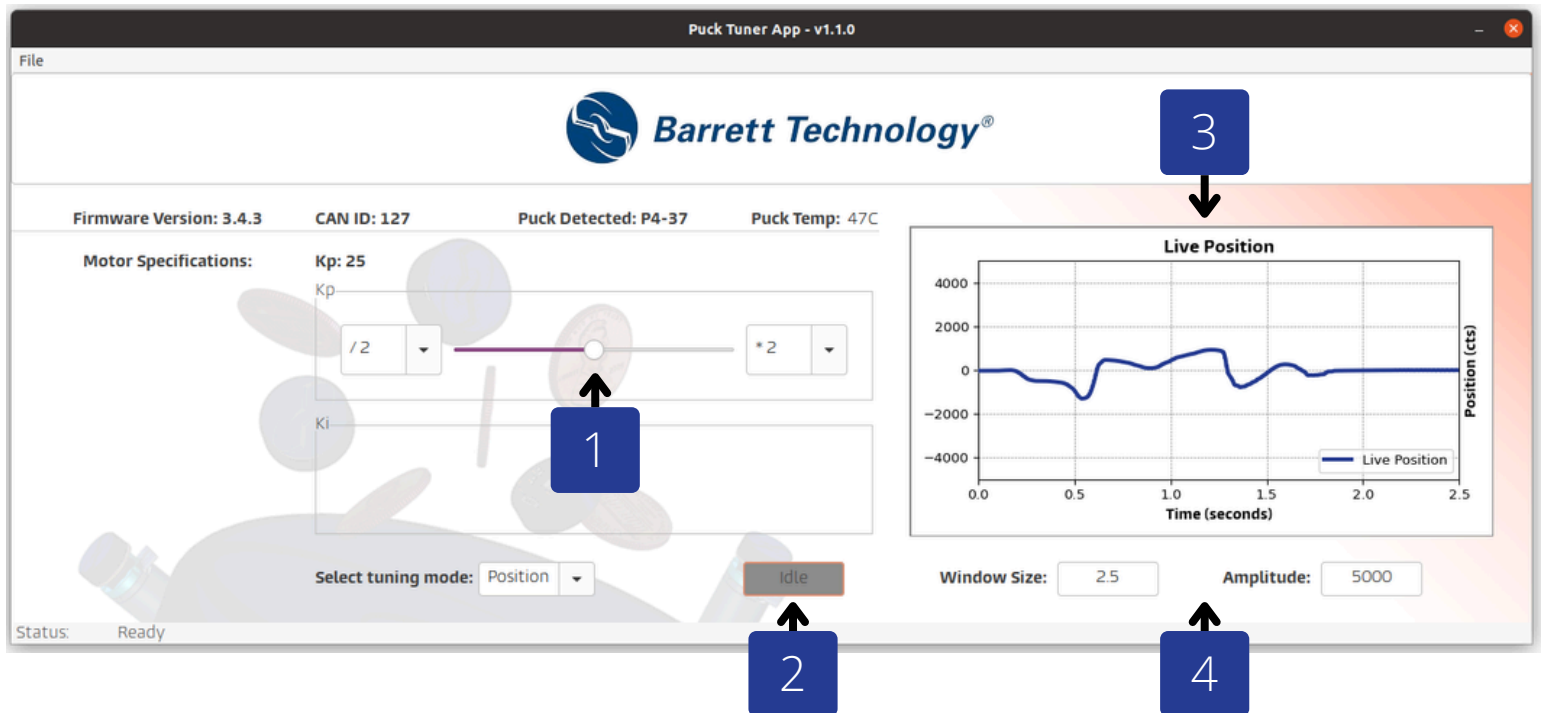
Position Response





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PUCK TUNER APP

Motor Tuning Procedure - Position Response

- 1 Kp Slider** - Adjust the slider to fine tune gains for smooth output.
Note: Use the adjustable multipliers to increase / decrease the the range of the sliders for fine / coarse adjustments.
- 2 Run** - Press Run to enable the Puck in position mode for final adjustments.
Note: The Puck will hold position at the location at the time the button is pressed.
- 3 Live Position Graph** - Verify the position response in real time.
Note: Run the motor in position mode and briefly disrupt the position. Monitor the response and adjust gains for smooth output.
- 4 Control Parameters** - Adjust window size and amplitude of the Live Graph.
Note: Adjust the window parameters to control the graph dimensions.

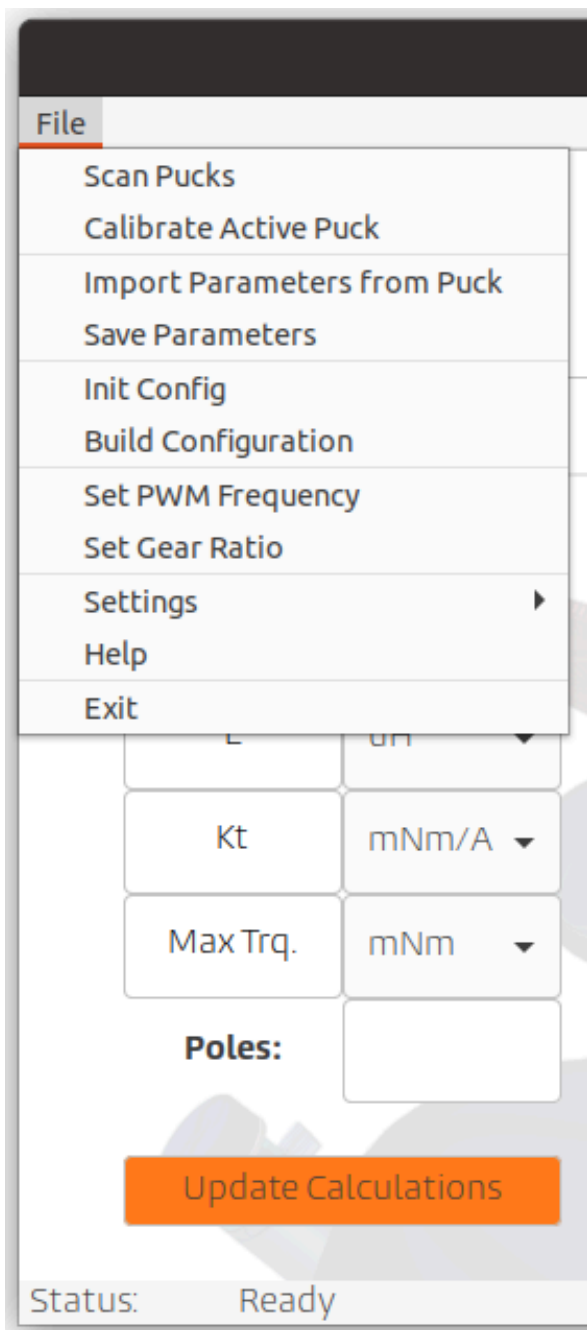
File Menu





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File Menu

Main Features

- 1 Scan Pucks** - Scans all nodes and automatically connects to lowest ID.
Note: Scan runs automatically at startup. Scan is only required if power or CAN were not connected at startup.
- 2 Calibrate Active Puck** - Automatically calibrates the Puck for the motor.
Note: All calibration steps run automatically. Verify motor parameters and test setup if calibration fails.
- 3 Import Parameters** - Import all data from the current Puck.
Note: Import automatically runs at startup. Use this feature to create an updated configuration.
- 4 Save Parameters** - Save (store) all parameters to the Active Puck.
Note: This overwrites previous data and stores updated parameters to the EEPROM.
- 5 Build Configuration** - Build a csv from the parameters stored on the Puck.
Note: The Puck Tuner App automatically places format- 'configuration-name-input'-date.csv.
- 6 Set PWM Frequency** - Update the PWM frequency for motor control.
Note: PWM Frequency is set automatically based on motor tau in new configs.
- 7 Set Gear Ratio** - Add motor revolutions to shaft revolutions.
Note: This feature allows the Puck Tuner App and other apps to automatically configure gear ratio at start up.
- 8 Settings** - Select active CAN device from the drop down menu.

Troubleshooting







Puck Tuning App Guide


TROUBLESHOOTING


No CAN bus Found!

CAN network was unable to initialize.
 This could be a missing driver or an issue with the CAN adapter.


 Verify the CAN driver is installed and active on the computer.
Check connections between the computer and Peak CAN adapter.


No Pucks found!

CAN network is initialized, but no active Pucks were found on the bus.
 This could be an issue with power or CAN connection.

 Ensure cables are properly connected.
Verify 5V and 3.3V LEDs are on.
If the issue persists, try reconnecting the CAN adapter to the computer.

Motor not spinning

A test is run but the motor does not spin or has significant cogging.
 This could be caused by an incomplete calibration or insufficient bus voltage.

 Use the ADC Monitor to verify the Puck is operating correctly.
Open the Calibrate menu and run through each calibration.
Verify correct configuration is in use.

Other issues

Incomplete Specifications! - Calculations failed due to missing parameters.

Puck Must Be Calibrated Before Use! - The Puck must be calibrated before running.

No Configuration Detected! - A blank Puck has been detected. Import data failed.

If a new issue occurs, please reach out for support from Barrett Engineers!

