

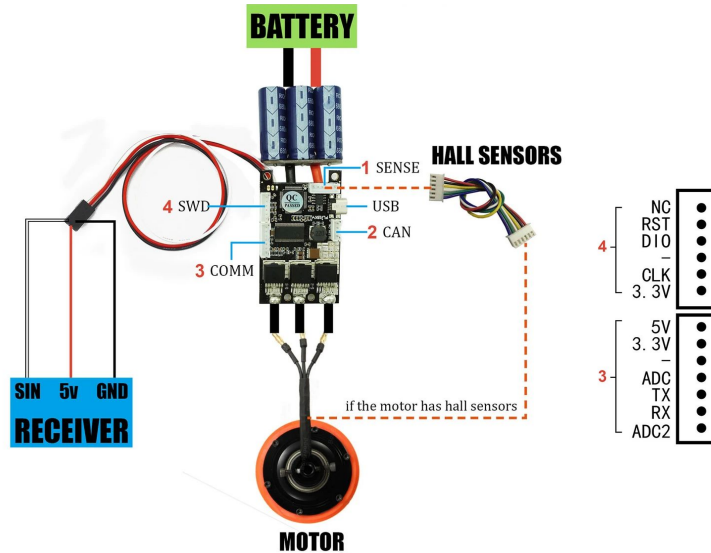


VESC - Vedder's Electric Speed Controller

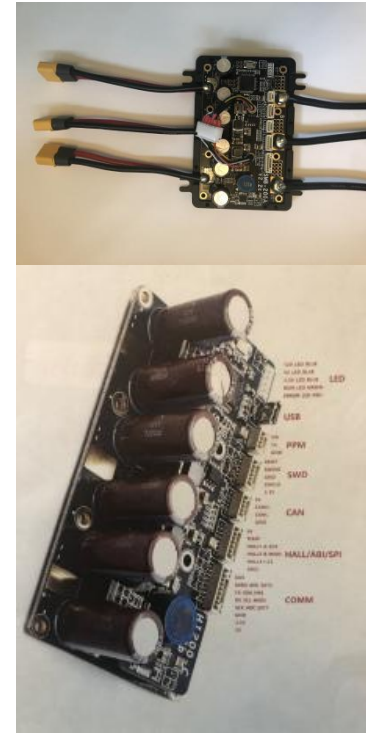
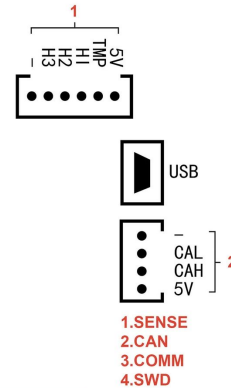
- VESC - Hardware
- VESC Tool - GUI
- BLDC - Firmware
- ChibiOS - RTOS

Jerry Yang, 9/14/2021

Hardware - VESC Boards

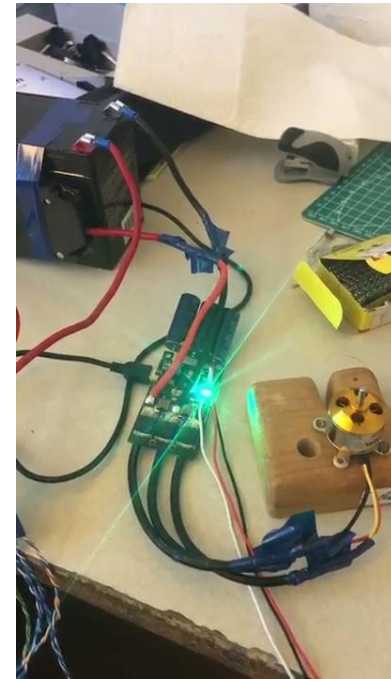
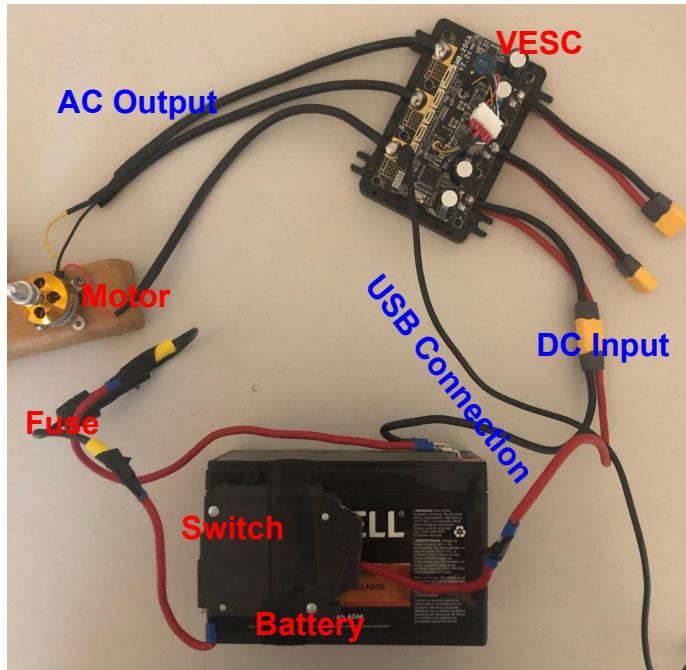


Flipsky F5ESC 4.12



SMB 200A

Hardware - Setup





Hardware - Accessories



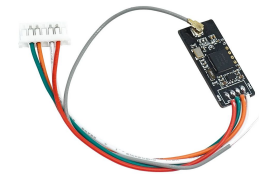
QWinOut A2212 Brushless
Outrunner - 200 g



Flipsky 6354 BLDC Belt
Motor - 2000 g

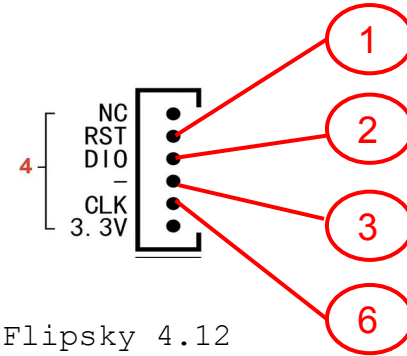


2.4Ghz Remote VX1 + Receiver



2.4G Bluetooth Module

Hardware - SWD



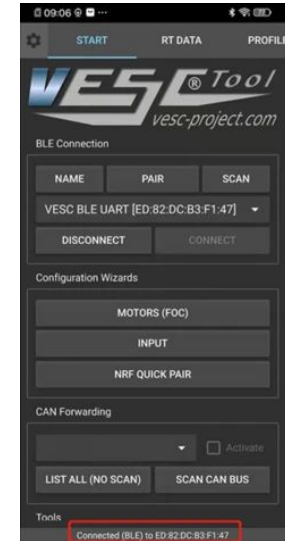
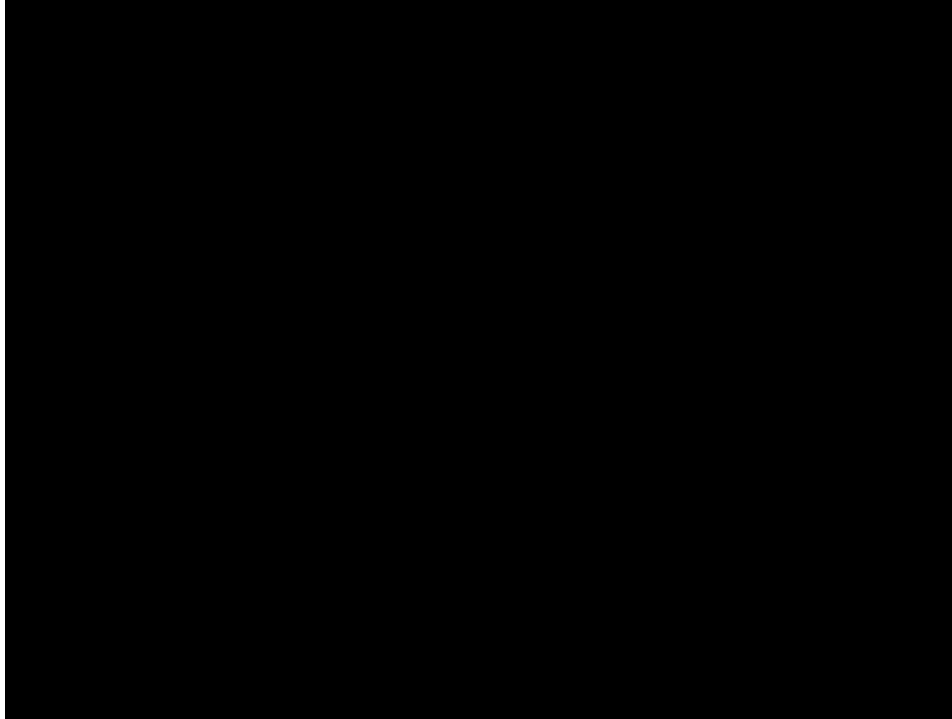
Flipsky 4.12

Required connections
for SWD programming:

- RST
- SWDIO
- SWCLK
- GND



Hardware - Wireless Connections



Mobile Vesc Tool +
Bluetooth Module



VESC Tool

The VESC Tool provides a GUI to configure both **motor** and **app** parameters

The screenshot shows the VESC Tool interface with the following components:

- Menu Bar:** File, ConfBackup, Tools, Wizards, Commands, Terminal, Developer, Help.
- Left Sidebar:**
 - Home icon: Welcome & Wizards
 - Connection icon: Connection
 - Firmware icon: Firmware
 - Motor Settings icon: Motor Settings** (highlighted in red)
 - General icon: General
 - FOC icon: FOC
 - PID Controllers icon: PID Controllers
 - Additional Info icon: Additional Info
 - Experiments icon: Experiments
 - App Settings icon: App Settings** (highlighted in red)
 - General icon: General
 - UART icon: UART
 - VESC Remote icon: VESC Remote
 - Nrf icon: Nrf
 - IMU icon: IMU
 - Data Analysis icon: Data Analysis
 - Realtime Data icon: Realtime Data
 - Sampled Data icon: Sampled Data
 - IMU Data icon: IMU Data
 - BMS Data icon: BMS Data
 - Log Analysis icon: Log Analysis
 - VESC Terminal icon: VESC Terminal
 - SWD Prog icon: SWD Prog
 - CAN Analyzer icon: CAN Analyzer
 - Debug Console icon: Debug Console
 - Settings icon: Settings
- Right Sidebar:** A vertical list of icons for various components: MOTOR, APP, RT, IMU, BMS, CAN, etc.
- Main Area:**
 - Header: WELCOME TO VESC® TOOL
 - Text: To get started, you can use the Setup Wizards to configure the motor and app settings respectively. Otherwise, you can connect to your VESC in the Connection page and go through the motor and app configuration pages manually.
 - Wizards Section: AutoConnect, Setup Motors FOC, Setup Input.
 - Bottom Panel: Real-time data and controls.

Bottom Panel Data:

D 0.20	ω 5000 RPM	IB 3.00 A	Anchor	STOP	Duty	0.0 %
I 3.00 A	P 0.00 °	HB 3.00 A			Current	0.00 A



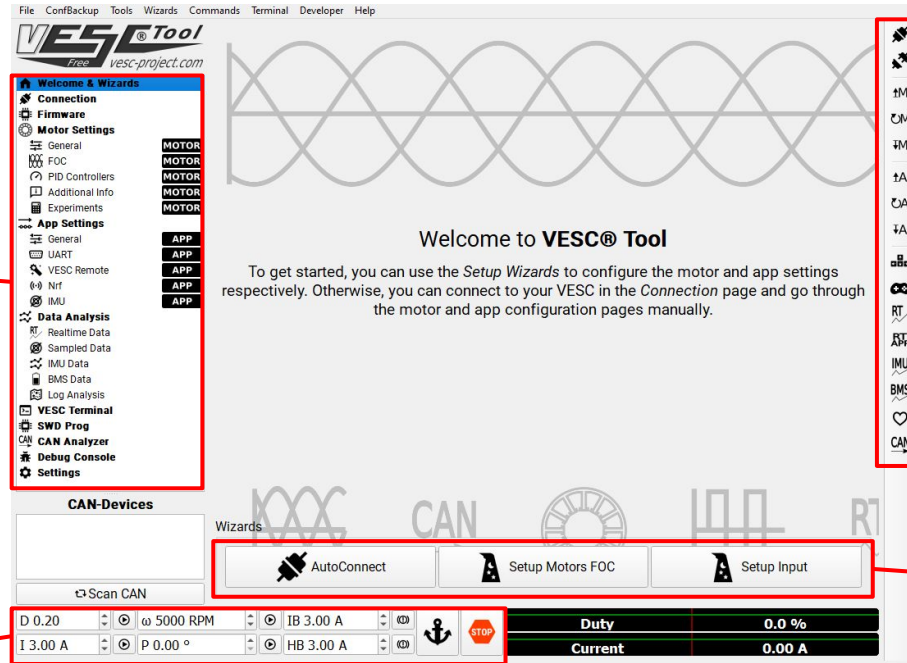
VESC Tool

Tools:

- Connection
- Firmware
- Data
- Terminal

Shortcuts:

- MC
- App
- RT Data
- Keyboard

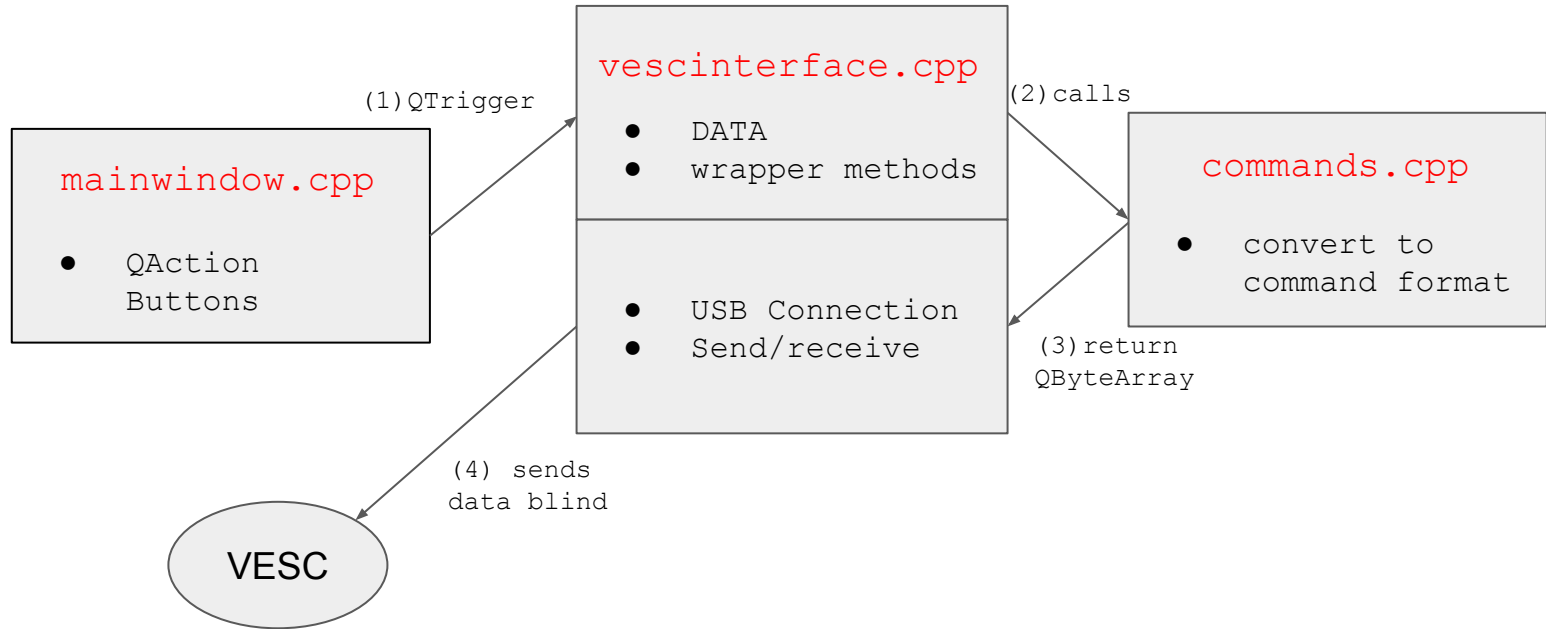


Controls

Setup Wizards

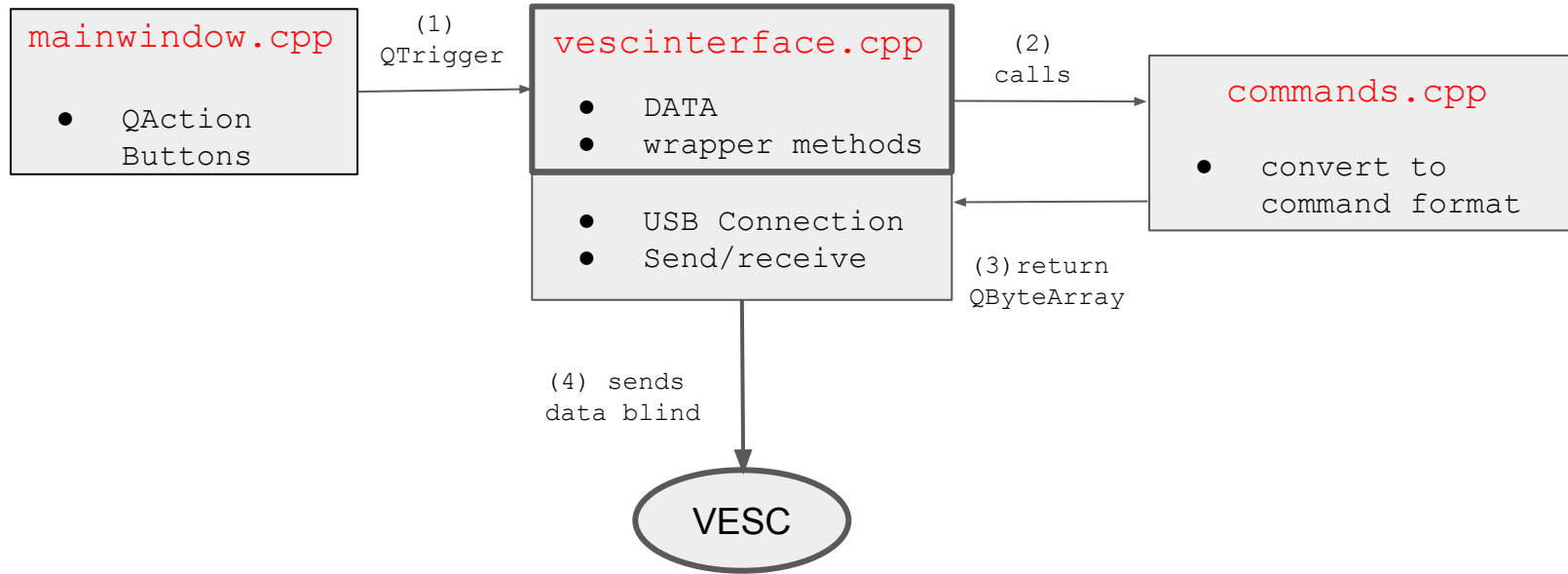


VESC Tool Code - vescinterface





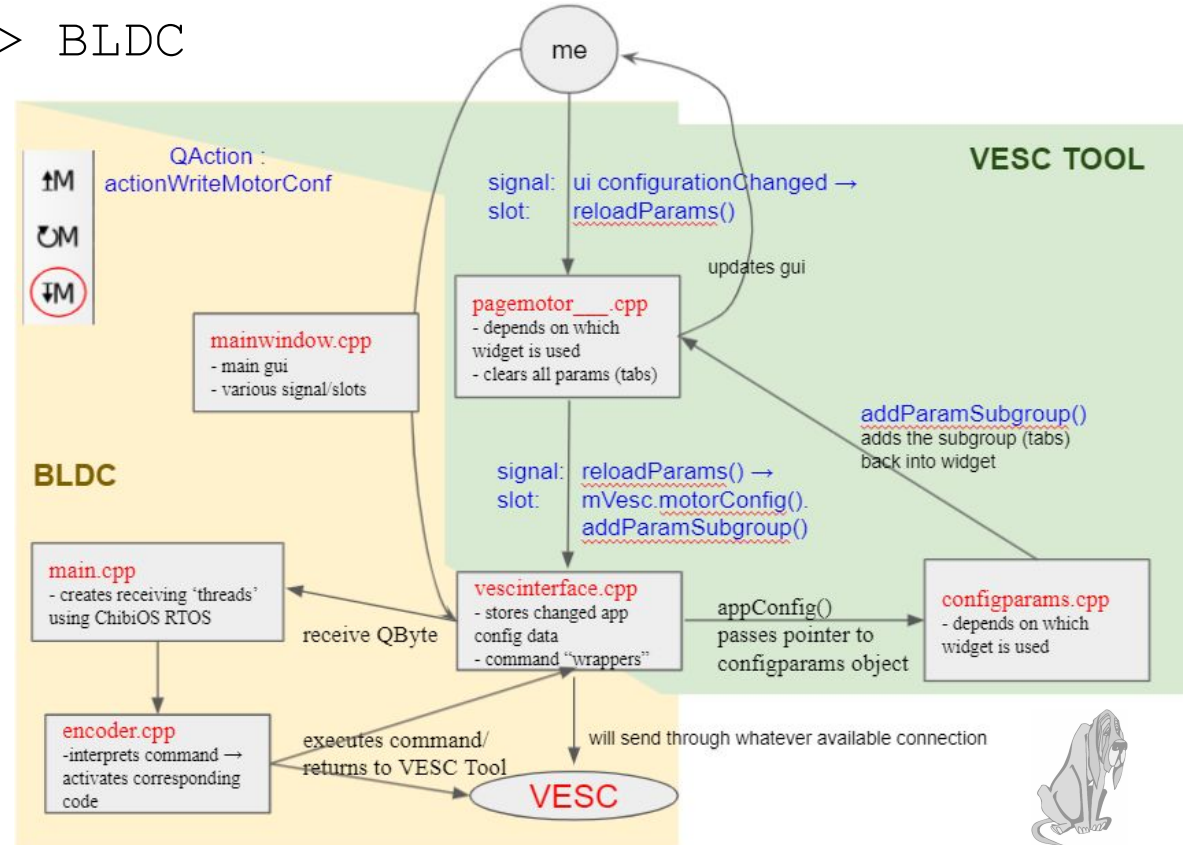
VESC Tool Code - vescinterface





VESC Tool -> BLDC

The VESC Tool GUI and BLDC firmware mainly interact through commands/data encoded as QByteArrays that are interpreted on both ends





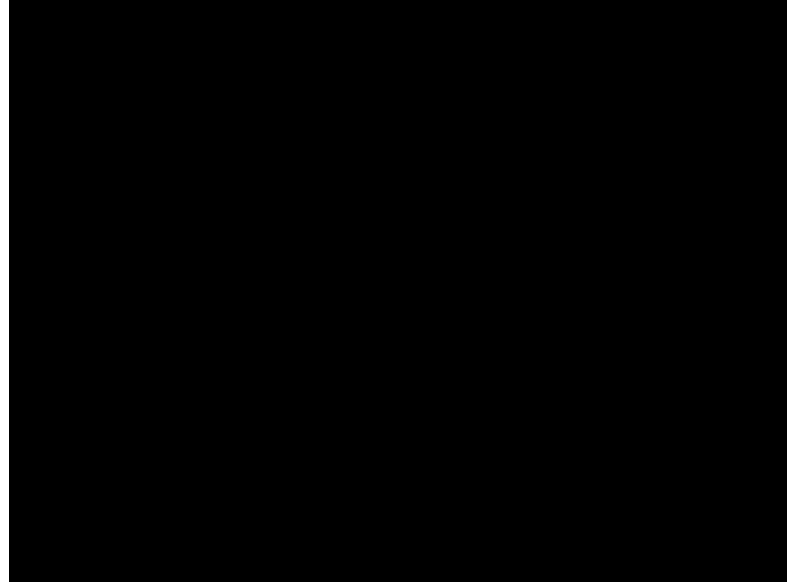
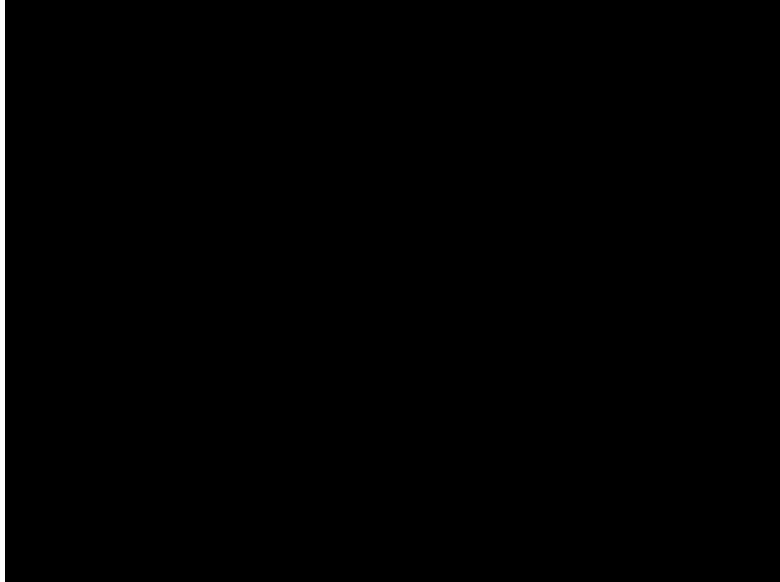
BLDC Code

Foundation	Basic/Helper	Core	Communication
<ul style="list-style-type: none">• HAL• ChibiOS• bms• compression• applications• hw	<ul style="list-style-type: none">• utils• packet• timer• worker• timeout• encoder• chconf	<ul style="list-style-type: none">• mcpwm• mc_interface• ledpwm• terminal• conf_general• commands• gpdrive	<ul style="list-style-type: none">• mc_interface• comm_can• comm_usb• bt

<https://github.com/vedderb/bldc>



BLDC Code - Revising terminal.c

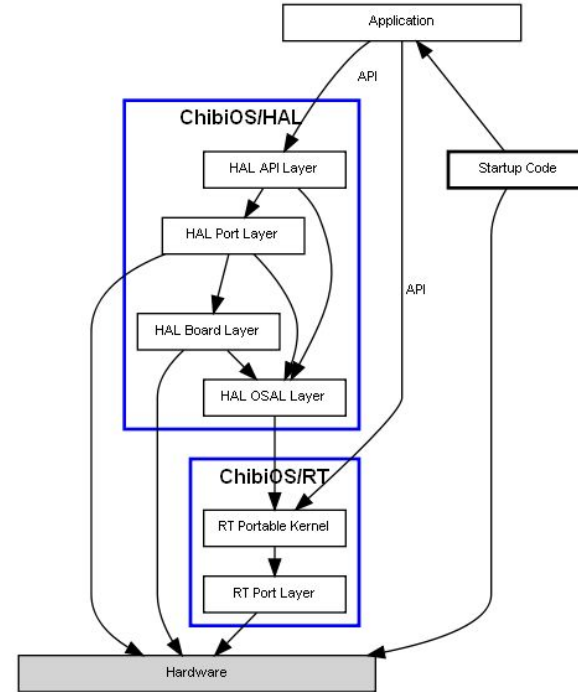




ChibiOS

ChibiOS/RT is a RTOS composed mainly of:

- RT - the RTOS Scheduler
- NIL - alternate RTOS
- OSLIB - extension library
- HAL - hardware abstraction layer
- SB - sandbox for RT/NIL code





References

- <https://vesc-project.com/>
- <https://github.com/vedderb/bldc>
- https://github.com/vedderb/vesc_tool
- <https://www.chibios.org/dokuwiki/doku.php?id=chibios:documentation:books:rt:start>

Thanks!