# SwarmDrive by NickStick

An open source ESP32 motor driver development board for brushless motors

SwarmDrive is a motor driver (development) board intended for learning and experimenting with electric motors. It's an approachable mechatronics platform for users who want to learn and start experimenting with (small) electric motors and BLDC (Brushless DC) motors in particular. The SwarmDrive board contains a basic motor driver setup together with a powerful, Wi-Fi-and-Bluetooth-enabled microcontroller (ESP32) and USB connectivity.

Designed for Experimentation and Learning

SwarmDrive enables professionals as well as students to learn about different commutation algorithms and all other aspects of electric (BLDC) motors in a convenient way - with a single, integrated board and strong educational documentation.
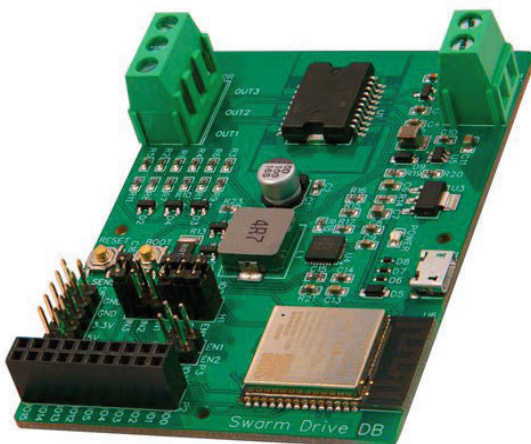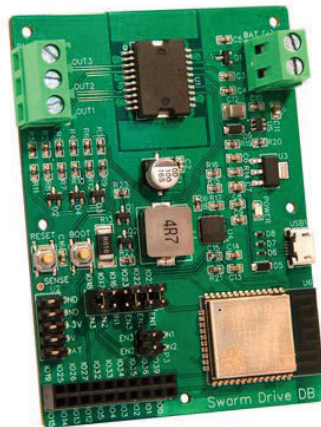
Specially designed console firmware as well as example code can be downloaded to get started quickly and easily. The code is well documented and open source and is based on the well-established ESP-EDF framework and RTOS. SwarmDrive can be used as a starting point for getting insight into the inner workings of algorithms for driving a motor.

SwarmDrive could be used for a range of applications, such as exploring and experimenting with different types of commutation strategies, PID experiments for balance plateau or balance robots, cartesian gantries and spatial navigation, drive by wire and wireless, swarm intelligence experiments, Etc.

Wireless Communication - Swarm Potential

The 'Swarm' aspect of the SwarmDrive is hinting upon the vast communication possibilities of the ESP32, such as Bluetooth and Wi-Fi, which enable the board or motor to communicate with other boards/motors. his allows for 'Swarm' type implementations or just plain remote control of the board/motors.

Features & Specifications
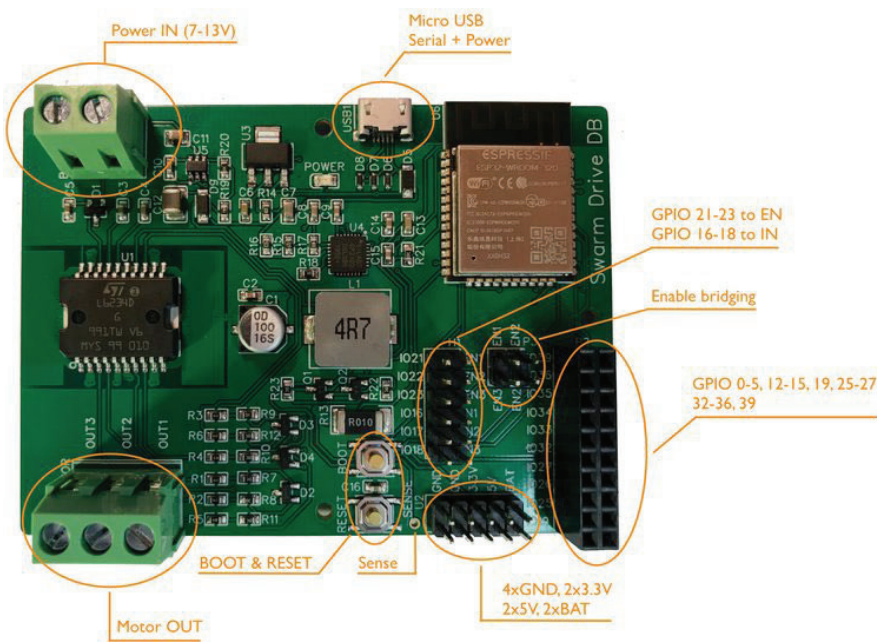
Microcontroller: ESP32 dual core, 240 Mhz, 4 Mb flash **Wi-Fi**: 802.11 b/g/n/d/e/i/k/r (802.11 n up to 150 Mbps) **Bluetooth**: v 4.2 BR/EDR and BLE specification
Driver: L6234 triple half bridge motor driver, 5 A peak current
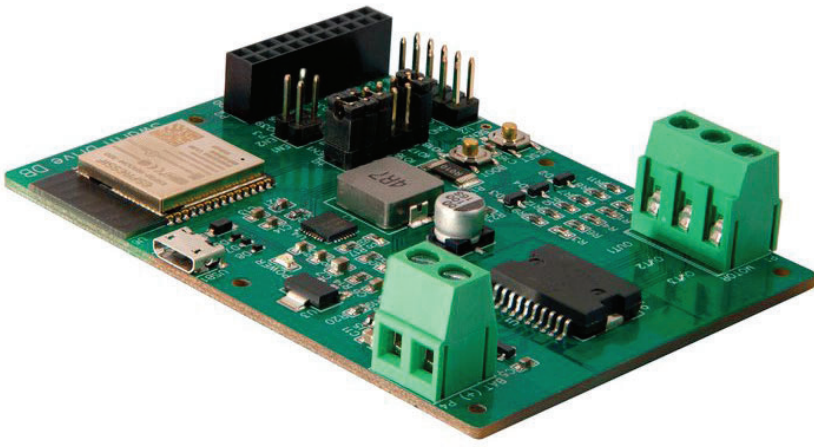   3x enable pins are broken out to a bridging connector
Communication: USB to UART bridge, micro USB serial + power
Input voltage: 7-13 V via screw terminal or pin headers **Motor connection**: via screw terminal
GPIO: 26 from ESP32 module
Power output pins: 5 V, 3.3 V, and GND
Boot and reset: via pushbutons

Comparisons

	SwarmDrive	M. Anton Consulting BLDC Motor Driver	ST STEVAL-IHM043V1	Separate shield board
Integrated MCU	ESP32	None	STM32F051	None
Wi-Fi	Yes	No	No	Separate
Bluetooth	Yes	No	Separate	
USB	Yes	No	No	Separate
Integrated buck converter	Yes	No	No	Separate
Back EMF sensing	Yes	Yes	Yes	Some
ESD protection	Yes	Yes	Yes	Some
Example firmware	Yes	No	Yes	Some
Open Source	Yes	Yes	Yes	Some

Open Source Documentation - Hardware and Firmware

You can find all hardware and software documentation in GitHub.

Firmware has it's own dedicated page, and you can get a thorough overview including introduction and theory on the SwarmDrive website.

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