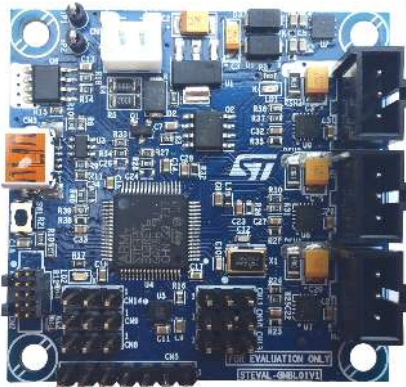


Reference design kit for Gimbal controller for drones and handheld applications



Features

- Up to three-axis Gimbal controller.
- Compact (50 x 50 mm) design, suitable for mounting on:
 - drones
 - handheld cameras
- Three [STSPIN233](#) low voltage three phase and three sense motor drivers.
- [STM32F303RE](#) microcontroller with ARM® Cortex®-M4 core able to simultaneously drive three PMSM motors:
 - MCU runs a high efficiency field oriented control (FOC) algorithm compatible with the most common position sensors on Gimbal motors (PWM or analogic inputs)
 - compatible with open loop sensorless algorithm
- Operating voltage from 6.0 V to 8.4 V (2 LiPo batteries).
 - maximum output current 1.3 A_{RMS}.
- Protection mechanisms:
 - triple single shunt current sensing network
 - non-dissipative overcurrent protection
 - short-circuit protection
 - thermal shutdown
 - hardware overvoltage and polarity inversion protection
- Measurement units:
 - on-board inertial measurement unit [LSM6DSL](#) (frame IMU)
 - compatible with external SPI/I2C inertial measurement units (camera IMU)
- Interfaces:
 - STEVAL-UKI001V1 Serial Wire Debug (SWD) board with cable
 - USB connector for real-time data communication
 - three connectors for Pitch, Roll and Tilt axis target angle inputs (PWM mode)
 - one channel DAC output and one GPIO test point for debugging purpose
- 2 Kbit serial I²C bus EEPROM for data storage
- WEEE and RoHS compliant

| Product summary | |
|--|---------------------------------|
| Reference design kit for Gimbal controller | STEVAL-GMBL02V1 |
| Mixed signal MCU ARM Cortex-M4 core with DSP and FPU | STM32F303RE |
| Low voltage three phase and three sense motor driver | STSPIN233 |

Description

The [STEVAL-GMBL02V1](#) reference design kit is a complete triple motor field-oriented control (FOC) demonstration and evaluation platform as well as an integrated environment for three axis Gimbal controller applications in the 6.0 V to 8.4 V_{DC} bus voltage range (2 LiPo batteries), which you can increase up to 11 V with a maximum output current of 1.3 A for each motor drive.

The design features the [STM32F303RE](#) microcontroller with ARM® Cortex®-M4 32-bit core and the [STSPIN233](#) low voltage three phase and three sense motor driver.

The kit is equipped with a USB interface for real-time data exchange and includes an STEVAL-UKI001V1 ST-LINK adapter for serial wire debug (SWD) and corresponding cable. If you mount the STEVAL-UKI001V1 on the ST-LINK/V2-1 debugging section of an [STM32 Nucleo-64](#) board, you can program and debug the [STM32F303RE](#) microcontroller with a compatible toolset via USB.

1.1 STEVAL-GMBL01V1 controller board schematic diagrams

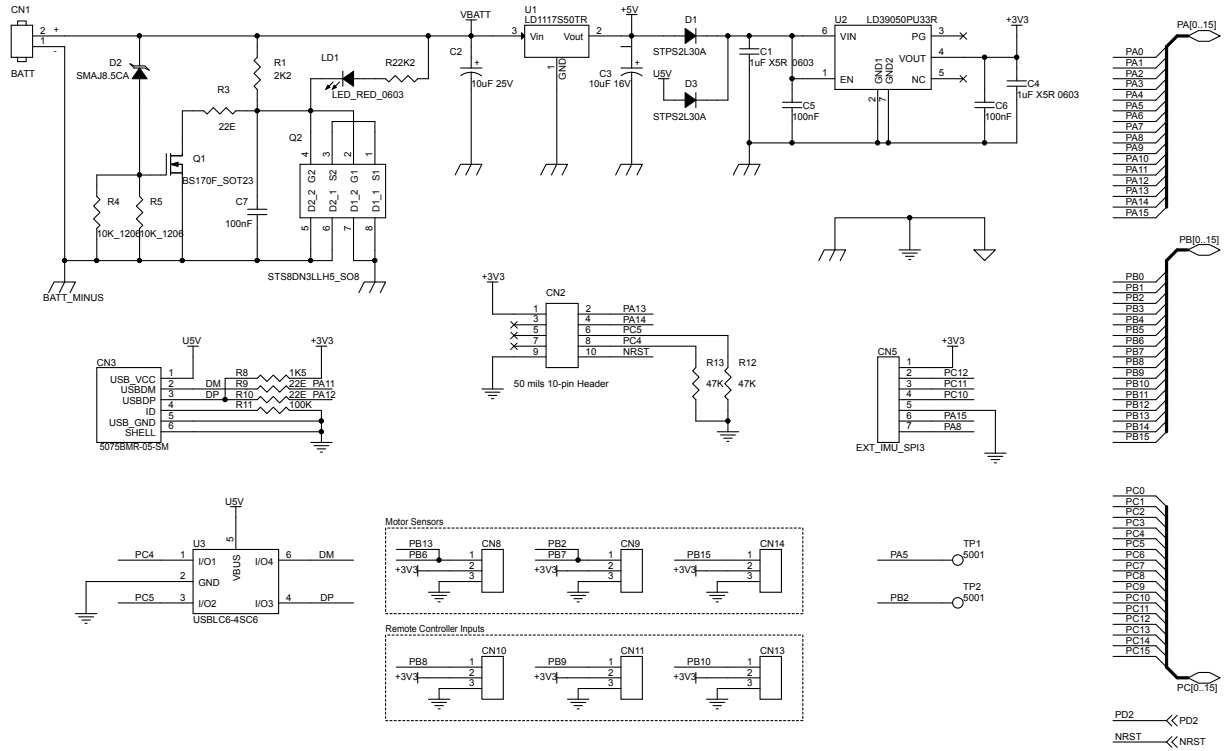
Figure 1. STEVAL-GMBL01V1 schematic - interfaces


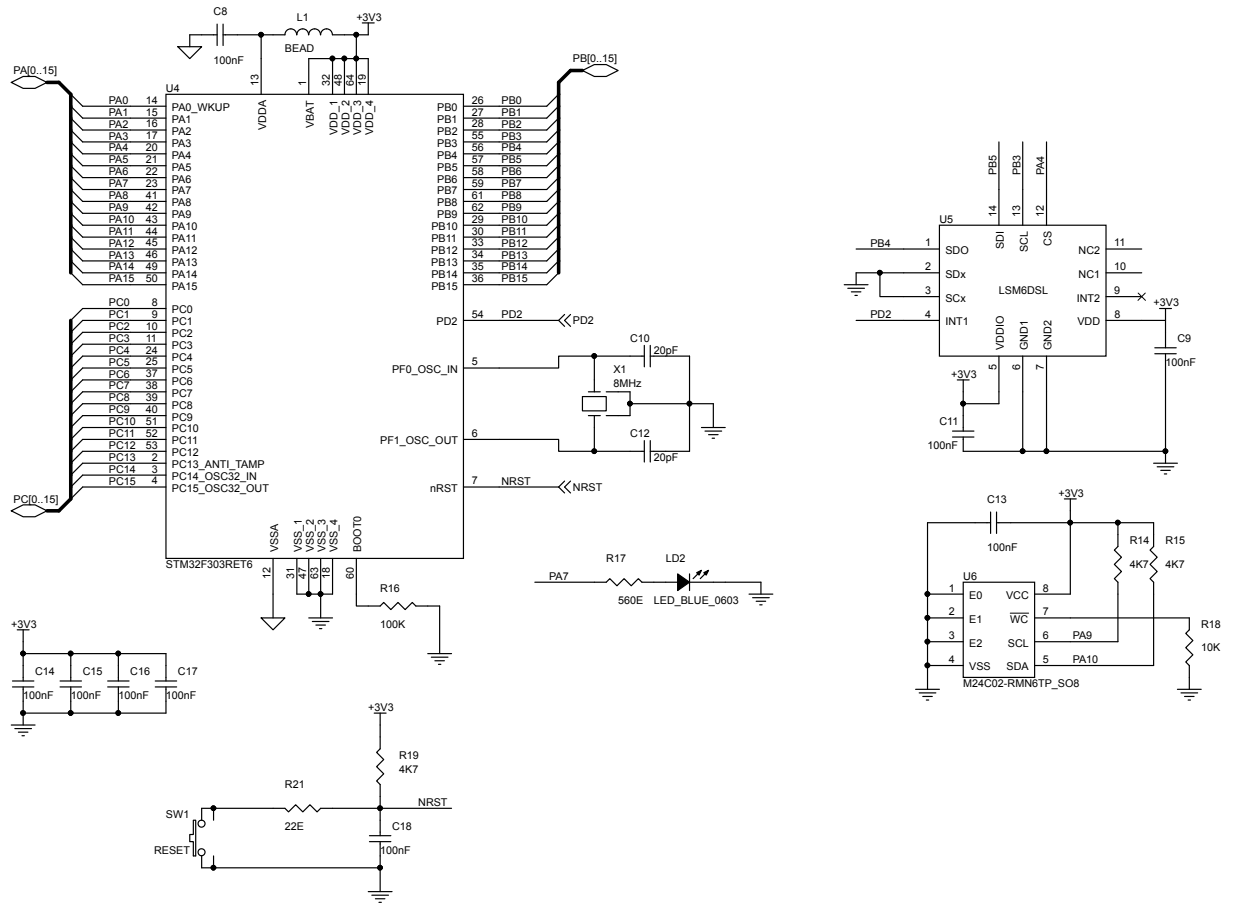
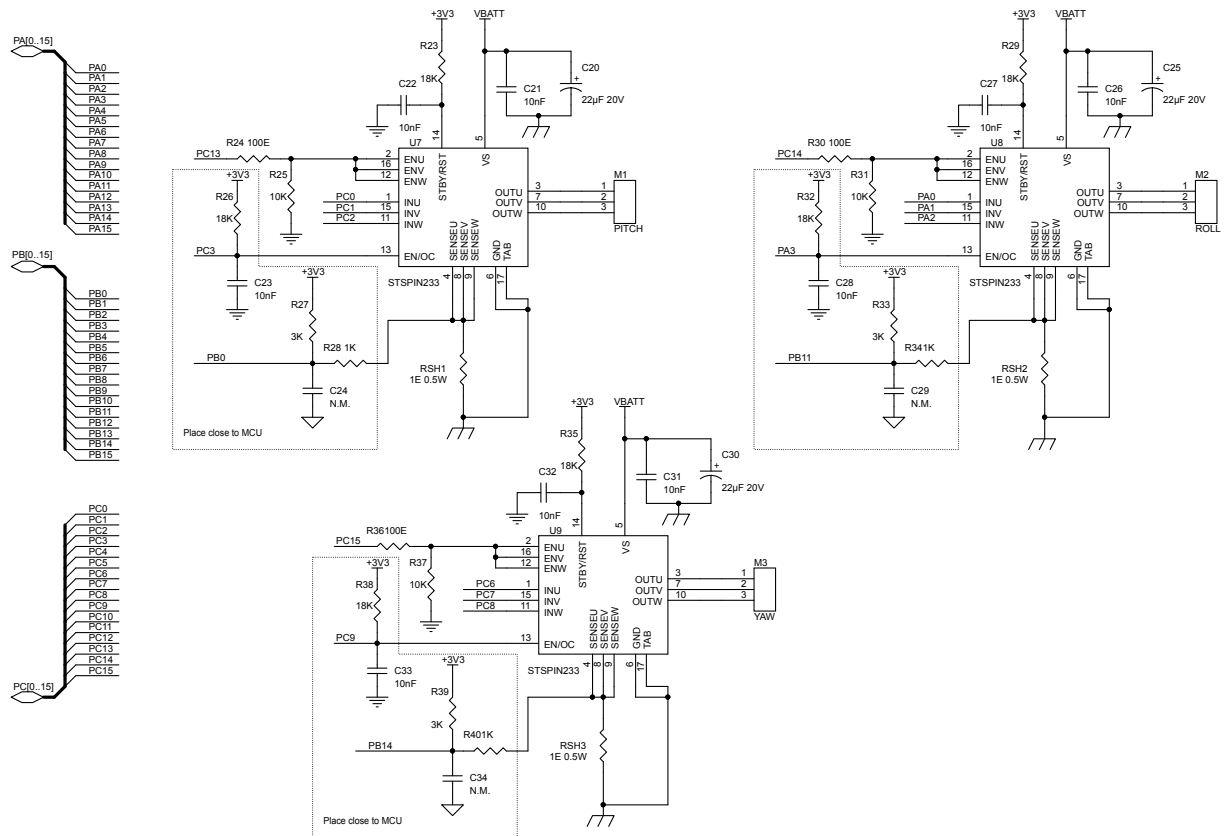
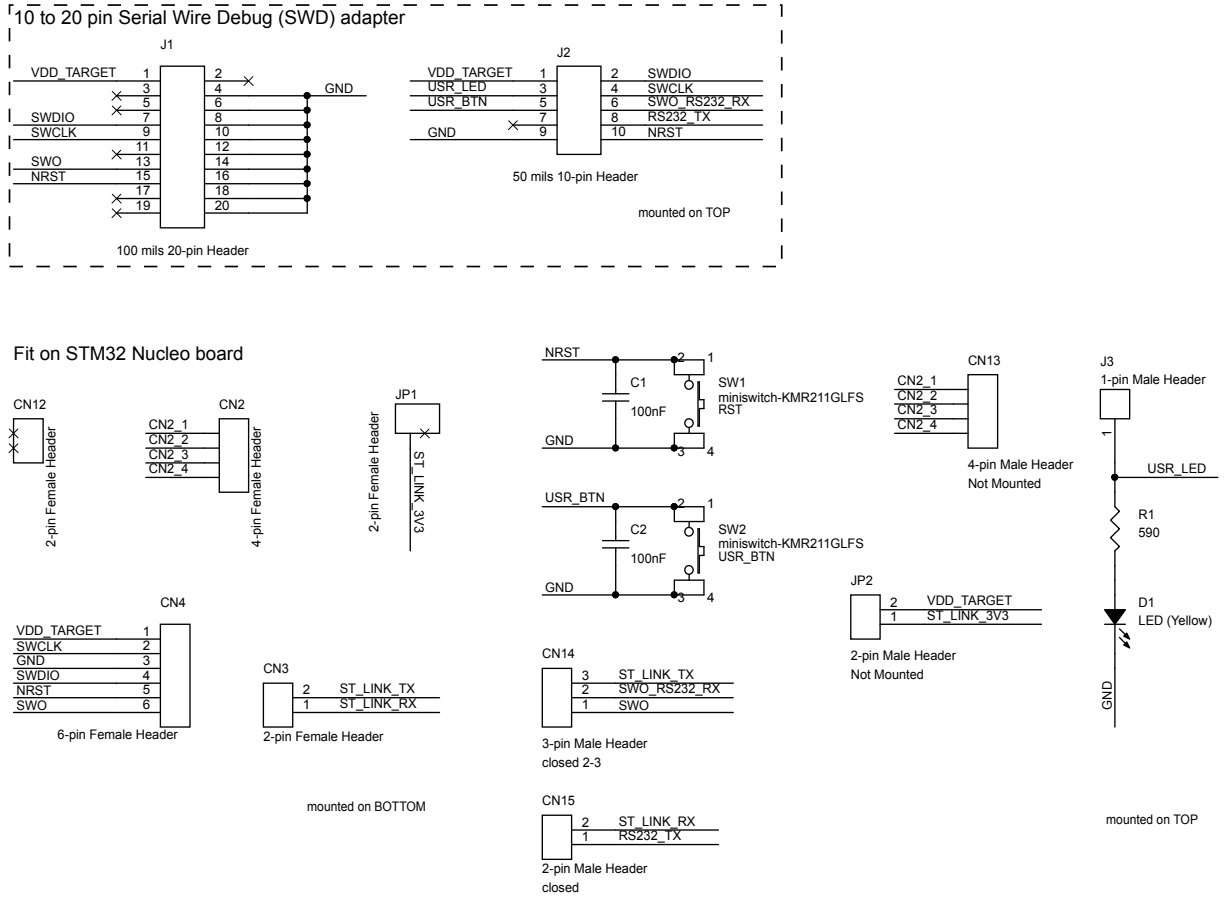
Figure 2. STEVAL-GMBL01V1 schematic – MCU, IMU sensor, EEPROM


Figure 3. STEVAL-GMBL01V1 schematic – motor control


1.2 STEVAL-UKI001V1 adapter board schematic diagram

Figure 4. STEVAL-UKI001V1 schematic



Revision history

Table 1. Document revision history

| Date | Version | Changes |
|-------------|---------|----------------------|
| 20-Aug-2018 | 1 | Initial release. |
| 18-Oct-2018 | 2 | Updated cover image. |

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