



HARDWARE AND SOFTWARE SOLUTION DEVELOPED IN ARM MBED ENVIRONMENT FOR DRIVING AND CONTROLLING DC BRUSHLESS MOTORS BASED ON ST X-NUCLEO DEVELOPMENT BOARDS

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Abstract – Aim of this work is the design and realization of a driving system for monitoring and controlling of a BLDC motor with Hall sensors embedded. The realized system is composed by three principal blocks: the control electronic board, the power driving board and the BLDC motor. The first block is based on the STM32 Nucleo development board assembled with the second one, the ST-X-Nucleo-IHM07M1 motor driver expansion board which integrates an L6230 IC driver. The used BLDC motor is the DF45M024053-A2 model provided by Nanotec. The firmware, needed to properly control motor operation, was developed in ARM mbed environment, a development tool available on cloud which allows to send the .bin file (obtained after firmware compilation) directly to the STM32 development board, regarded from operating system, once connected via USB to PC, simply as an external memory. By PC connected via USB with STM32 board, the user can choose the motor rotation direction, set the desired rpm value and, by varying potentiometer value located on board, change the rotation speed. Furthermore, different controls are performed during motor operation such as on PWM duty-cycle value (if it is equal to 100% , then power supply is removed), on temperature value of L6230 IC driver and a control of motor rotation; in this latter case, if BLDC motor is stalled for a time period higher than 3 seconds, then the power supply is interrupted in order to safeguard the motor/system integrity.

Index terms: Electronic control systems, Brushless DC Motor, Driving board, Firmware programming.