UM2440
User manual

STSW-L99ASC03 Graphical User Interface (GUI)

Introduction

This document describes the STSW-L99ASC03 Graphical User Interface (GUI) dedicated to set and control the EVAL-L99ASC03. This is an evaluation board designed for sensorless 3Phase BLDC motor control.

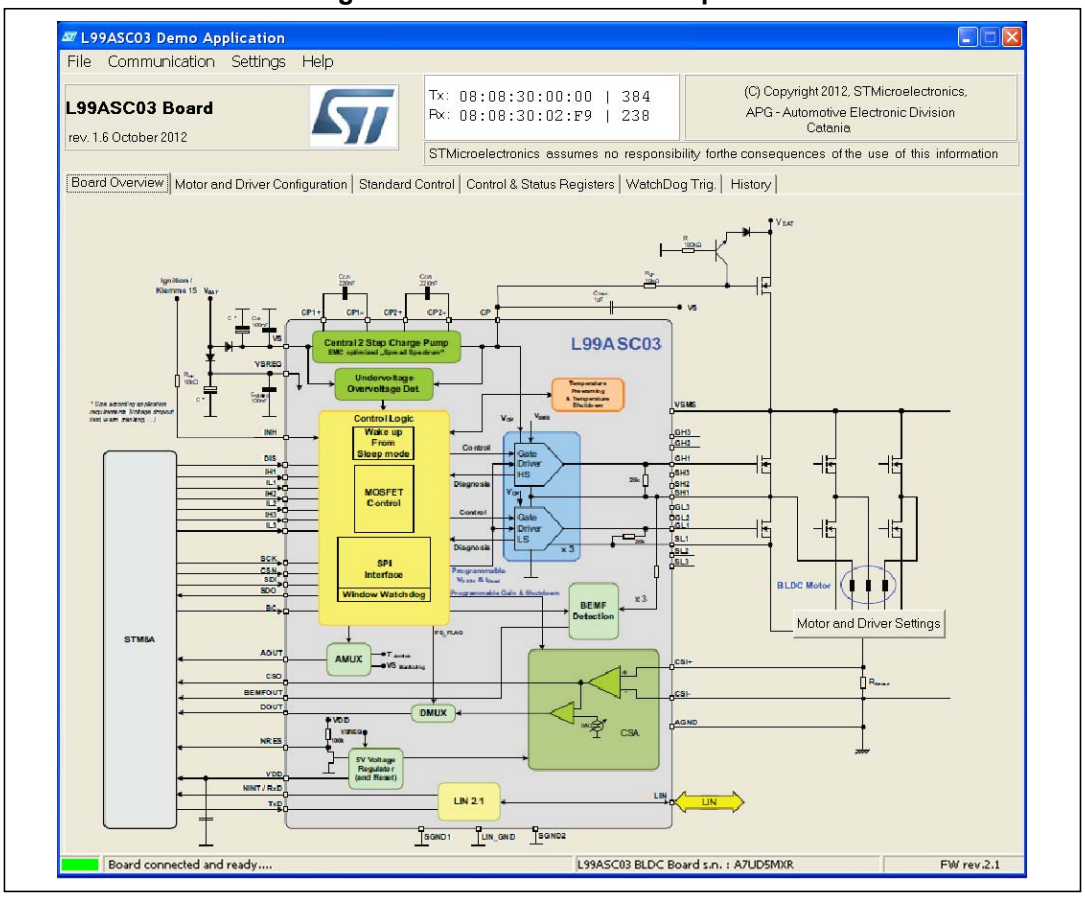
The STSW-L99ASC03 has been developed by using C++ and it works with motherboard based on STM8 microcontroller programmed with dedicated firmware that drives the L99ASC03 assembled in the daughter board.

Contents

1 Software installation

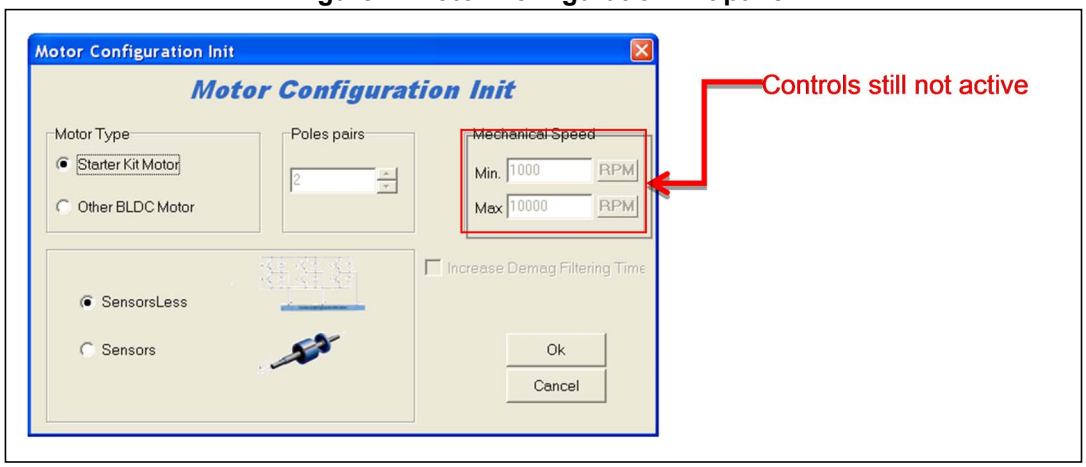
- Download GUI from www.ST.com
- Run the downloaded executable file this will extract the files to <your chosed folder>
- Open the folder and open the directory <GUI_Installer>
- Click and run the setup file Setup_L99ASC03.exe
- This can be placed in your choice of folder
- Open the folder
- Click on executable file L99ASC03.exe and window below should appear

Figure 1. Software installation panel



2 Motor Configuration Init panel

Figure 2. Motor Configuration Init panel



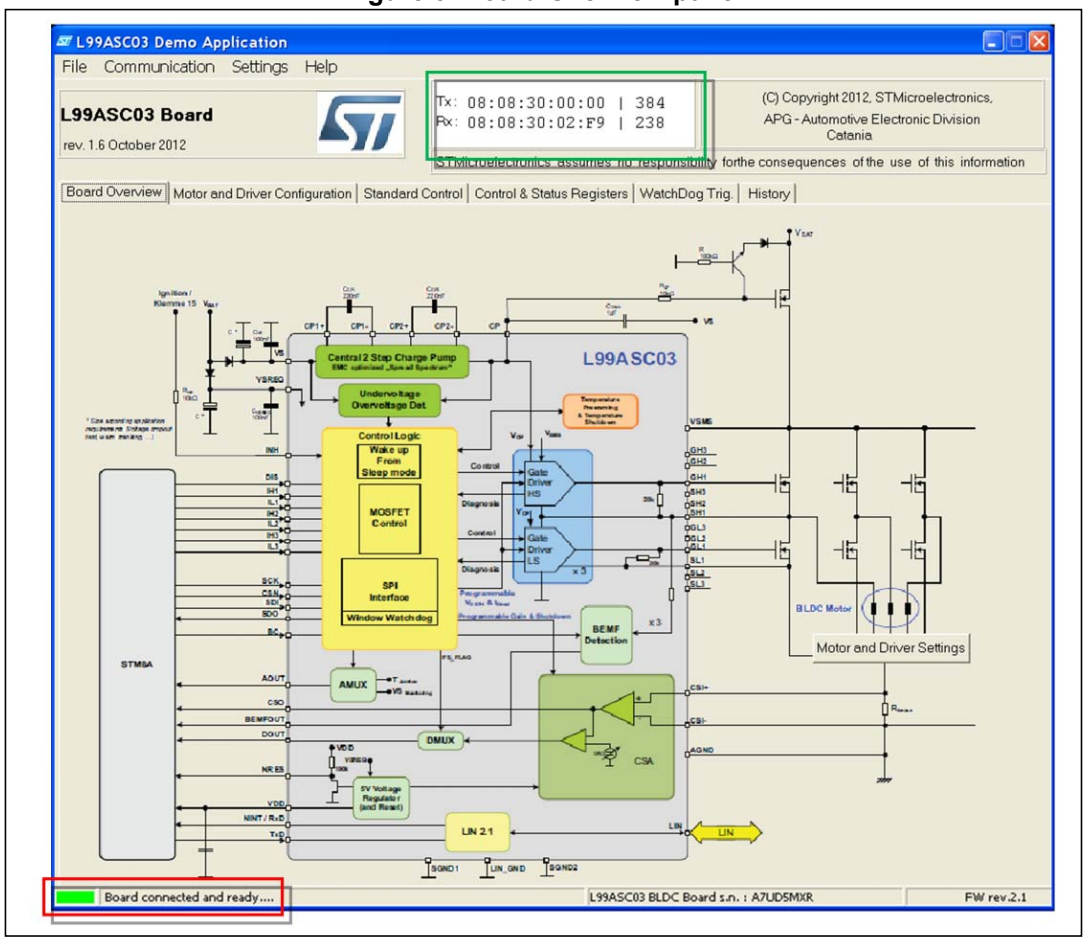
If the motor used has a number of pole pairs different than two, select other BLDC motor, set the number of pole pairs and finally press OK.

Starter Kit Motor: **AMETEK** 24V BLDC Low Voltage Blower

To drive the motor through Hall Sensors rotor position detection, extra hardware has to be soldered on the daughter board. Finally, if the motor used has a long demagnetization time, it could be mandatory to increase the micro demag filtering time by checking the Increase Demag Filtering Time check box.

3 Board Overview panel

Figure 3. Board Overview panel



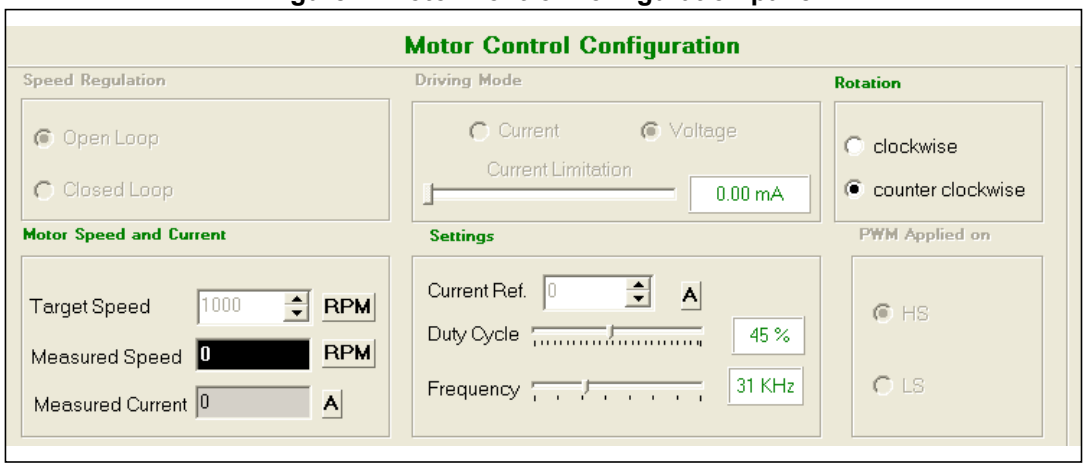
This panel just gives an overview of the BLDC driver application.

In the green rectangle are provided info on the communication between PC and micro. Tx shows the frames sent from the PC to the micro, whereas Rx shows the frames sent from the micro to the PC.

In the red rectangle are provided info about the connection status between demo board and PC. If Green, the connection is OK, if RED, the connection is NOK.

4 Motor Control Configuration

Figure 4. Motor Control Configuration panel

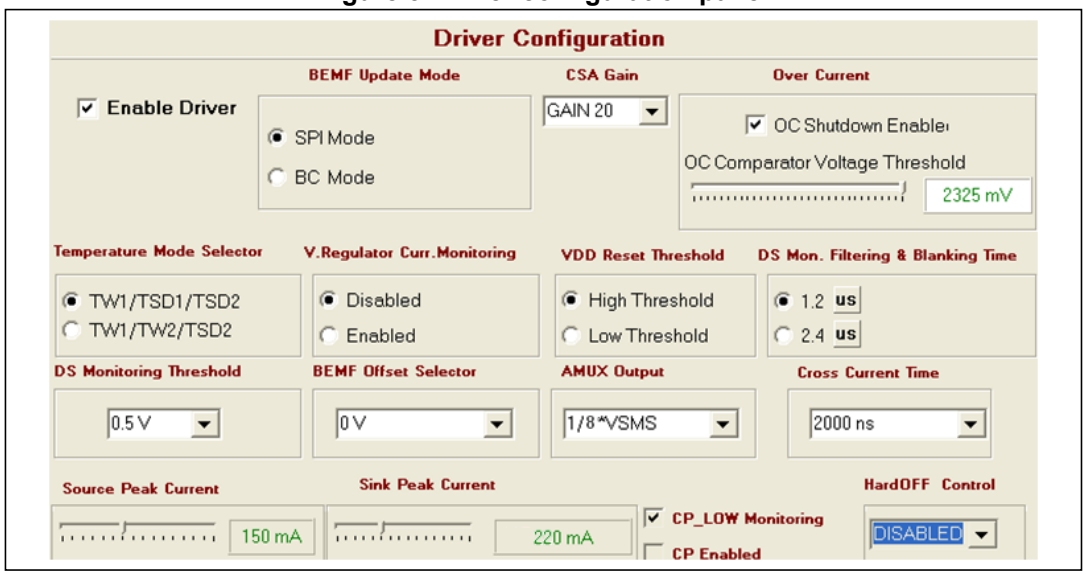


This section allows enabling/disabling speed regulation, selecting motor driving mode (In voltage driving mode it is also possible to set a current limitation threshold), selecting motor spinning direction and selecting switching MOSFETs (HS or LS).

The PWM frequency can be also set from this section. Some features are still under development and hence currently disabled. The picture above shows the default settings of this section, namely the settings right after a board power-on.

5 Driver Configuration

Figure 5. Driver configuration panel



When the Enable Driver check box is checked the micro pulls down the device DISABLE input pin. Instead, when the Enable Driver check box is unchecked the micro pulls up the device DISABLE input pin.

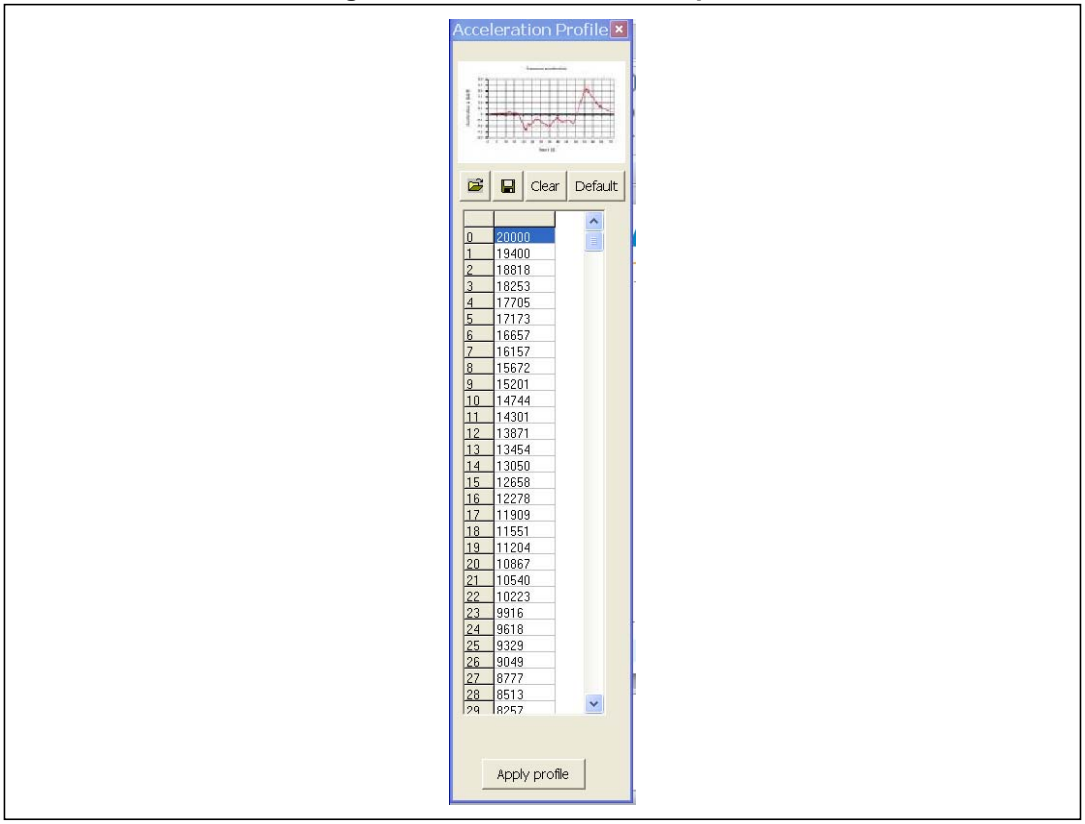
When the SPI BEMFCNT update mode is selected the micro will send SPI frames to update the BEMFCNT, while when the BC BEMFCNT update mode is selected the micro will generate positive pulses at the BC input pin to update the BEMFCNT. In BC mode the micro will generate positive pulses with a width of ~1.5 µs.

When the motor is running and the break feature is enabled, checking the OC Shutdown Enable check box, since the CSAOC flag is sent to the DOUT pin, which is also connected to the micro TIM1 break input pin, an OC event will shut down the gate drivers (OCSHUTD=1) and also switch off the TIM1 outputs. Whereas when the break feature is disabled, unchecking the OC Shutdown Enable check box, an OC event will neither shut down the gate drivers (OCSHUTD=0) nor switch off the TIM1 outputs.

The effect of the BEMF OFFset over the BEMF zero crossing detection through the BUS/2 comparator can be evaluated only in BC mode due to firmware limitation. In fact, in SPI mode the BEMF OFFset will not work properly (due to firmware limitation, since the firmware does not update the BEMF offset SIGN control bit), often leading to a motor lost of synch.

6 Acceleration Profile

Figure 6. Acceleration Profile panel

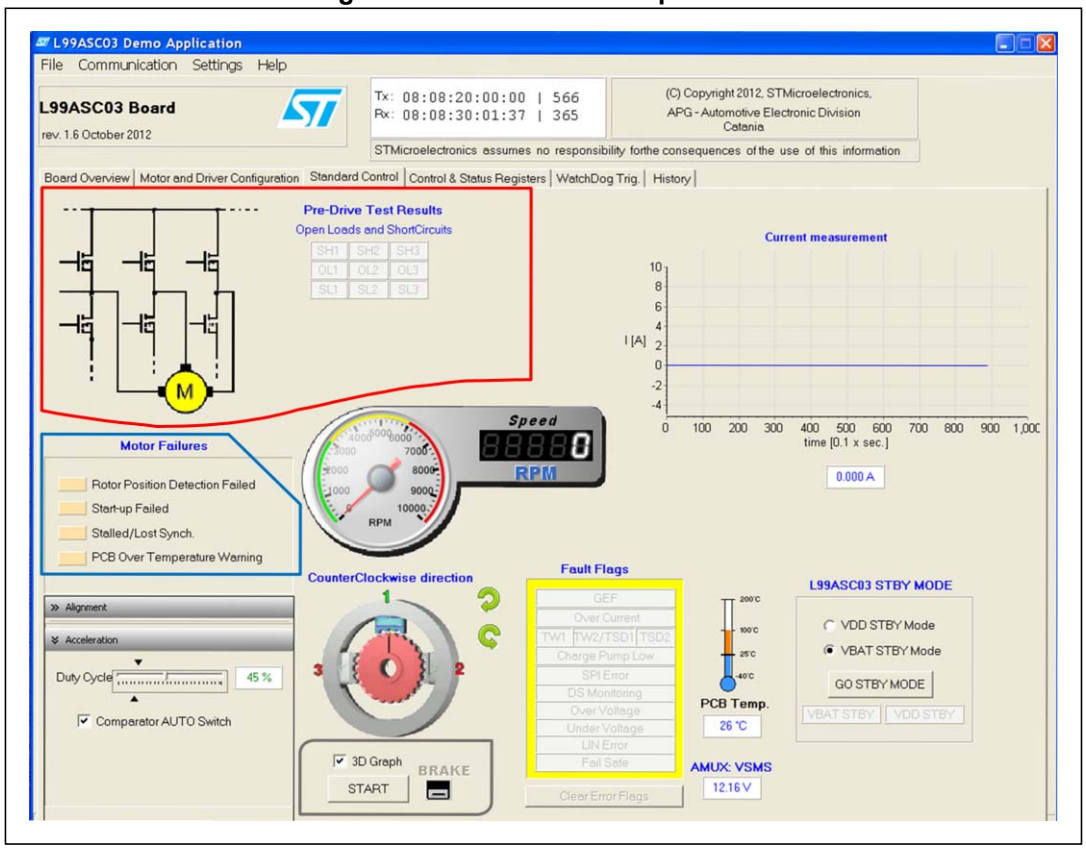


If the motor is different than the Starter Kit one, then the right motor acceleration profile should be loaded. To do so, it is possible to update the table and save it on a file. Once the table has been updated, remember to press the apply profile button to download the new acceleration profile.

7 Standard Control panel

7.1 Standard Control panel 1/3

Figure 7. Standard Control panel 1/3



7.1.1 Pre-Drive Test Results (red part)

Each time the START button is pressed, before the motor start-up sequence, the device runs a pre-drive test. The test results (open loads or short circuits) are displayed in this standard control panel section. In case a failure is detected, the motor start-up sequence is promptly aborted.

7.1.2 Motor Control Failure Flags (blue part)

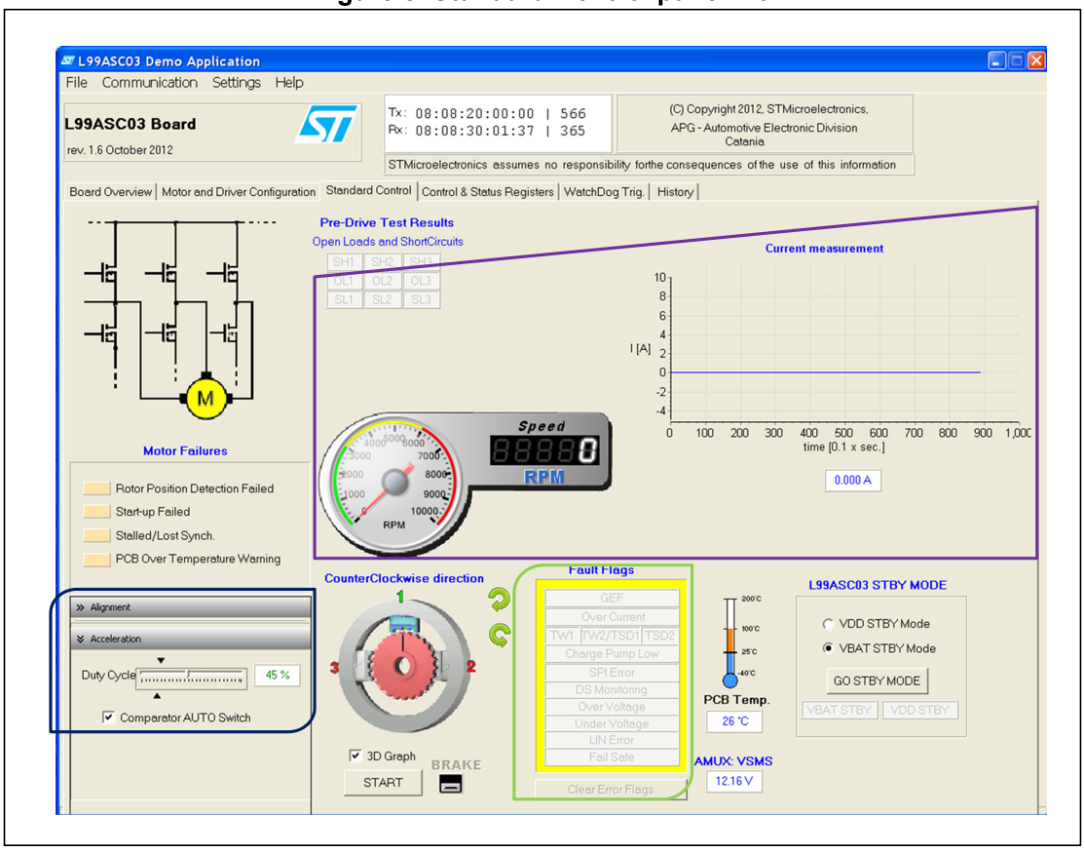
Each time a motor failure occurs, an error flag is set in the motor control failures section of the standard control panel. For instance, after 10 missing valid BEMF Z events, due to synchronization loss, the motor will stop and the STALLED/LOST SYNCH flag will be set.

7.1.3 Motor Start/Stop & Brake Buttons (gray part)

The START/STOP button allows starting/stopping the motor. The BRAKE button brakes the motor by shorting the three motor phases to GND.

7.2 Standard Control panel 2/3

Figure 8. Standard Control panel 2/3



7.2.1 Current and Speed Measurement (violet part)

The tachometer provides the motor speed (RPM) calculated from the step time. The current is measured by the micro that reads the CSA output connected to a micro analog input.

7.2.2 Fault Flags (Green part)

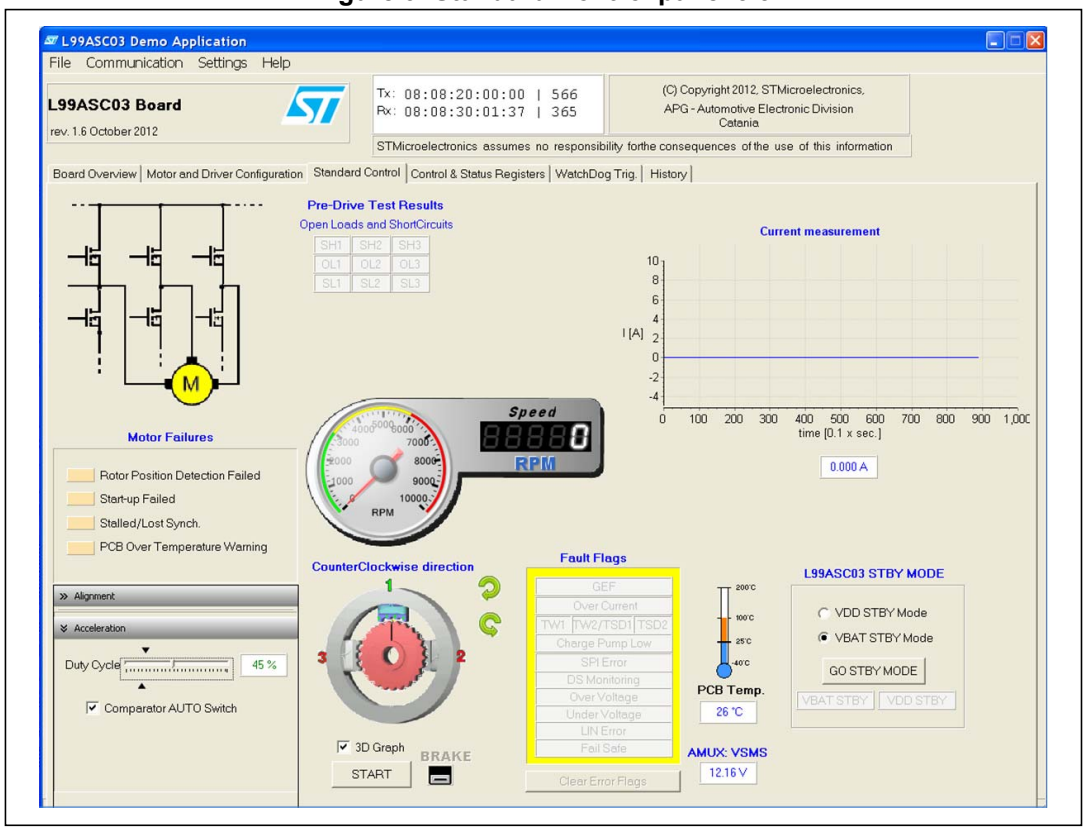
This is the combination of some grouped ORed error flags . The Clear Error Flags button clears all SRs with one single SPI command.

7.2.3 Shortcut Menus (black part)

The short cut menus allow setting quickly some parameters linked to the motor start-up phase and the motor speed in the open loop voltage driving mode.

7.3 Standard Control panel 3/3

Figure 9. Standard Control panel 3/3



7.3.1 Current Measure

When the Rsense on the demo board has been changed, in order to have correct feedback of the current read by the micro, it is possible to change the Rsense value (set to 10mOhm by default) by right-clicking on this indicator.

7.3.2 PCB Temperature Measure

In order to trim the PCB temperature sensor, it is possible to change the sensor operating output voltage by right-clicking on this indicator.

7.3.3 Motor Direction Control

This control selects the motor spinning direction.

7.3.4 STDBY MODE ENTRY Control

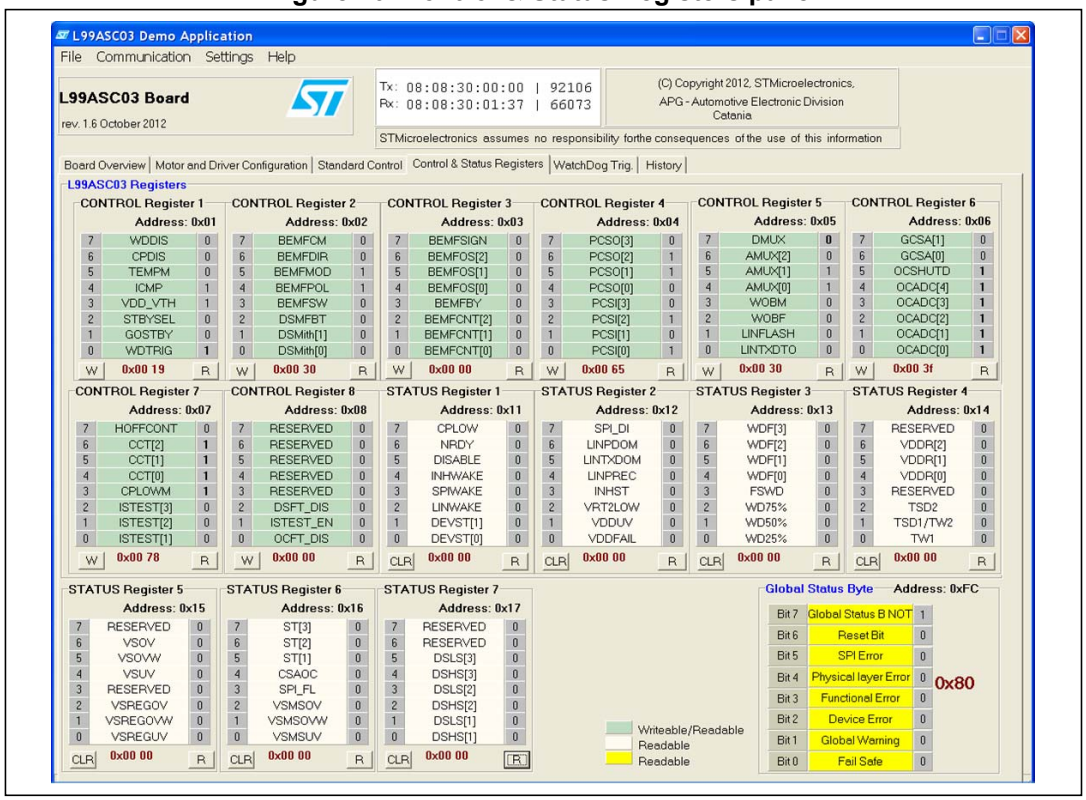
This control allows entering the selected STDBY mode of the device.

7.3.5 Temperature & AMUX measures

These indicators provide the PCB temperature and AMUX output measurements, which are both read by the micro through a correspondent analog input.

8 Control & Status Registers Panel

Figure 10. Control & Status Registers panel



8.1 Control Registers

Even though it would be better to change the device settings through the Motor & Driver Configuration Panel, the control registers panel allows direct write/read access to each device control register. To display a register value at any time, a read should be performed through the dedicated register R button. After a register write command (W button), a read of the same register is automatically performed.

8.2 Status Registers

The status registers can be either read or cleared through the related buttons. After a clear the new register value will be displayed.

8.2.1 Control Registers default values

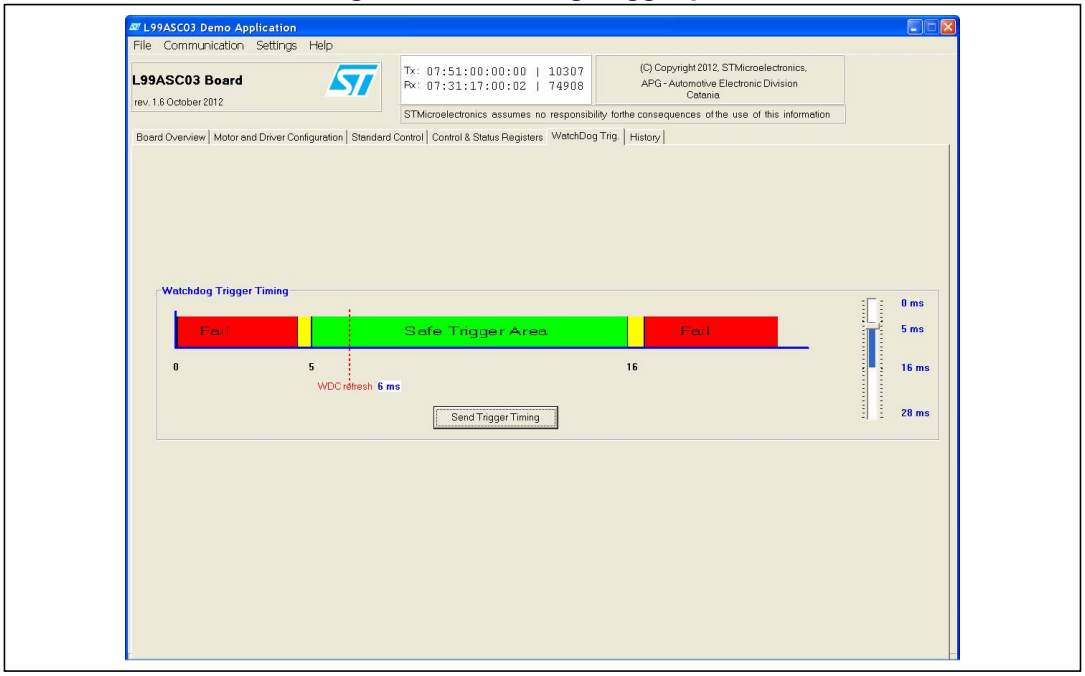
After the demo board power-on the control registers default values should be the ones shown in the picture above.

8.2.2 Global Status Byte

The GSB provides the GSB value.

9 Watchdog Trigger Panel

Figure 11. Watchdog Trigger panel

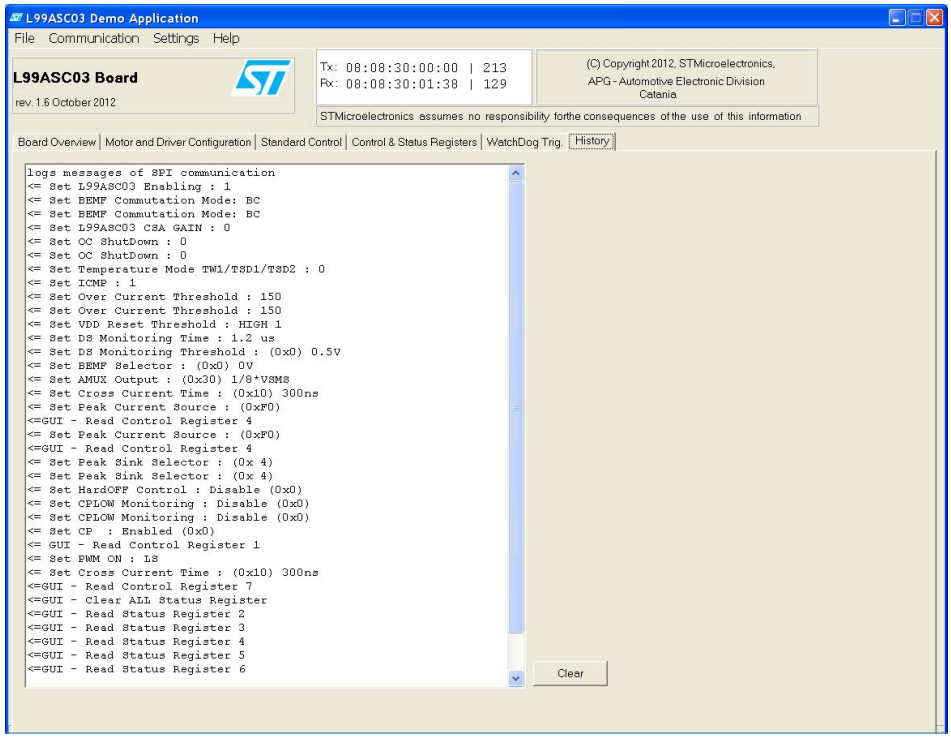


9.1 WatchDog Trigger Timing

This control allows selecting the WDG trigger frequency. The send button should be pressed to update the WDG refresh frequency with the selected value.

10 History Panel

Figure 12. History panel



10.1 History

This panel logs every action/command sent by the GUI to the micro.

11 GUI & Firmware version

Be sure that your GUI and Firmware versions are up-to-date.

12 Revision history

Table 1. Document revision history

Date	Revision	Changes
06-Jul-2018	1	Initial release.