
EVAL-L99ASC03 Evaluation Board

Introduction

The EVAL-L99ASC03 is an evaluation board designed for sensorless 3Phase BLDC motor control.

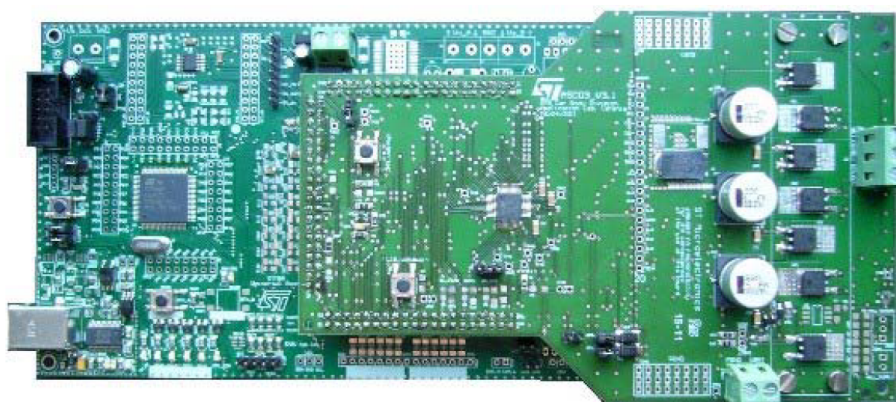
1 EVAL-L99ASC03 Board

The EVAL-L99ASC03 is composed by a motherboard and a daughter board on which is pre-assembled the L99ASC03G (see [Figure 1](#)). The system features an enhanced power management power supply functionality including various standby modes.

The motherboard, based on STM8 microcontroller, provides the logic section for monitoring and driving the L99ASC03G assembled in the daughterboard.

With the aim to make the board usage and setting simpler, STM provides a dedicated Graphic User Interface (GUI). This enables the user to set L99ASC03G parameters and at the same time it shows real time device information as the current evolution, motor speed (RPM), the fault flags, the board temperature and much more.

Figure 1. EVAL-L99ASC03



2 Hardware description and setup

This section provides a description of the main components of this evaluation kit, giving instruction for a quick setup of the system.

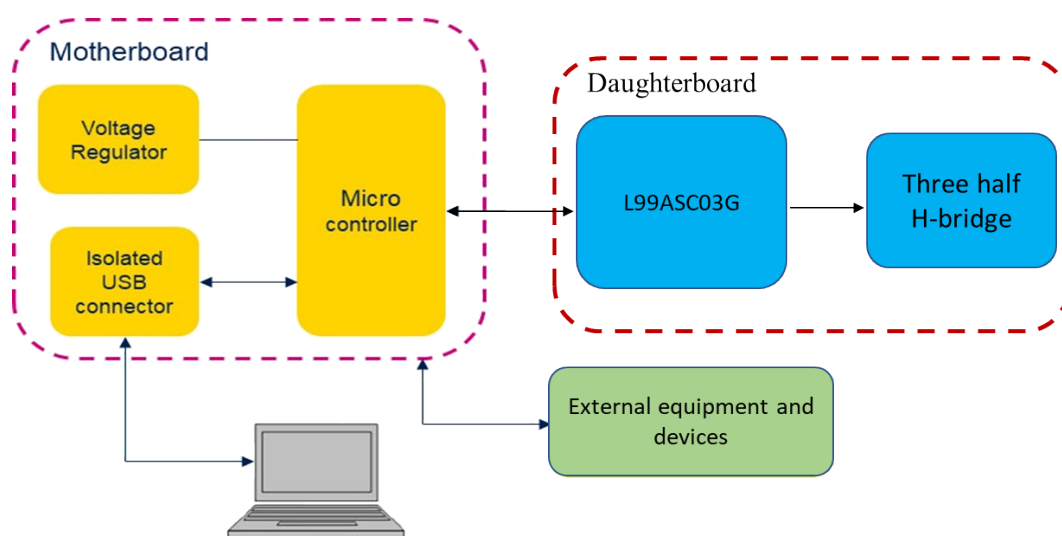
2.1 Components description

The evaluation kit consists of two main components:

- N.1 Motherboard based on STM8A microcontroller, interfacing host PC with daughterboard. The communication with the PC is established through isolated USB.
- N.1 Daughterboard assembling L99ASC03G.

The daughterboard with L99ASC03G and the motherboard are provided already properly plugged.

Figure 2. EVAL-L99ASC03 block diagram



2.2 Motherboard schematic

A universal motherboard is used to control and drive the daughterboard containing the L99ASC03G. The motherboard has the following functions:

- USB-to-UART conversion: a FT232RL USB to serial UART interface is used to convert the data from the GUI, in the PC, in commands that are processed by the microcontroller.
- STM8AF51xAT microcontroller: it is used to convert the commands from the GUI in control signals for the L99ASC03G in the daughterboard. Also it process the data received from the L99ASC03G and return the results to the GUI by the USB.
- L4995R LDO: this LDO is used to convert the +12 V used to supply the motherboard to a +5 V supply voltage used to supply the microcontroller and the L99ASC03G in the daughterboard.
- Socket and connectors to plug the daughterboard.

The motherboard schematic is shown in the following figures. The schematic and BOM of the motherboard can be found on the ST website.

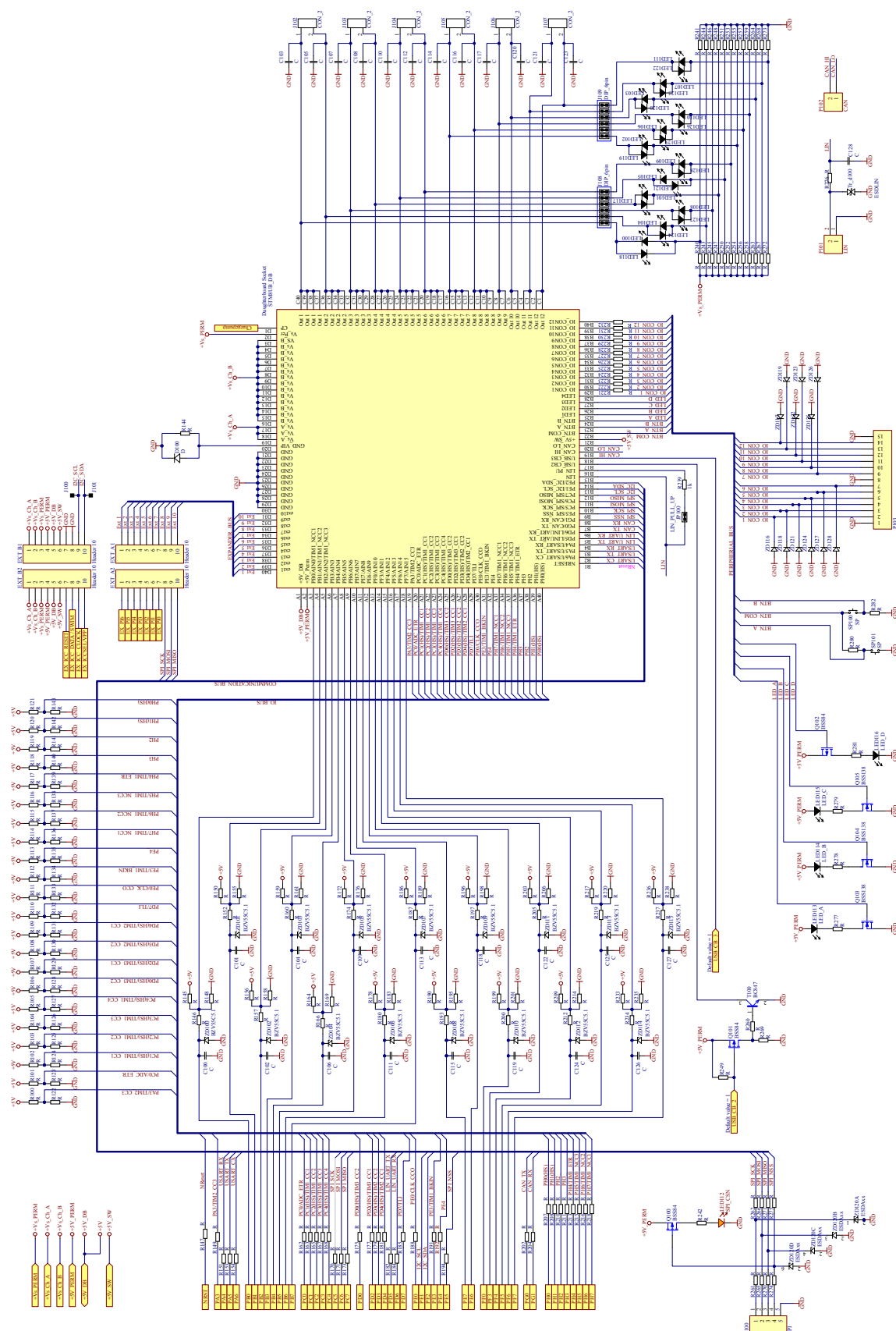
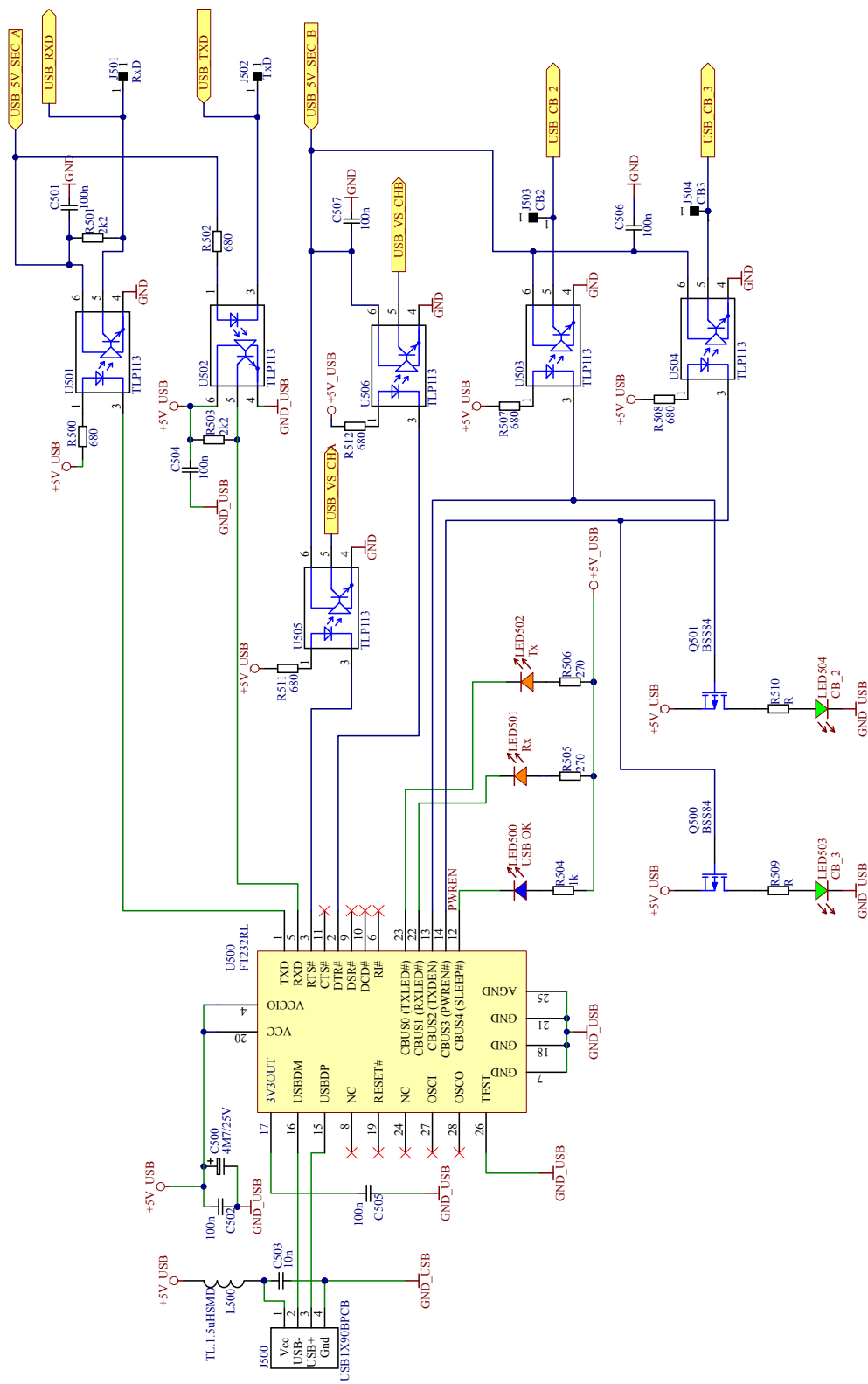
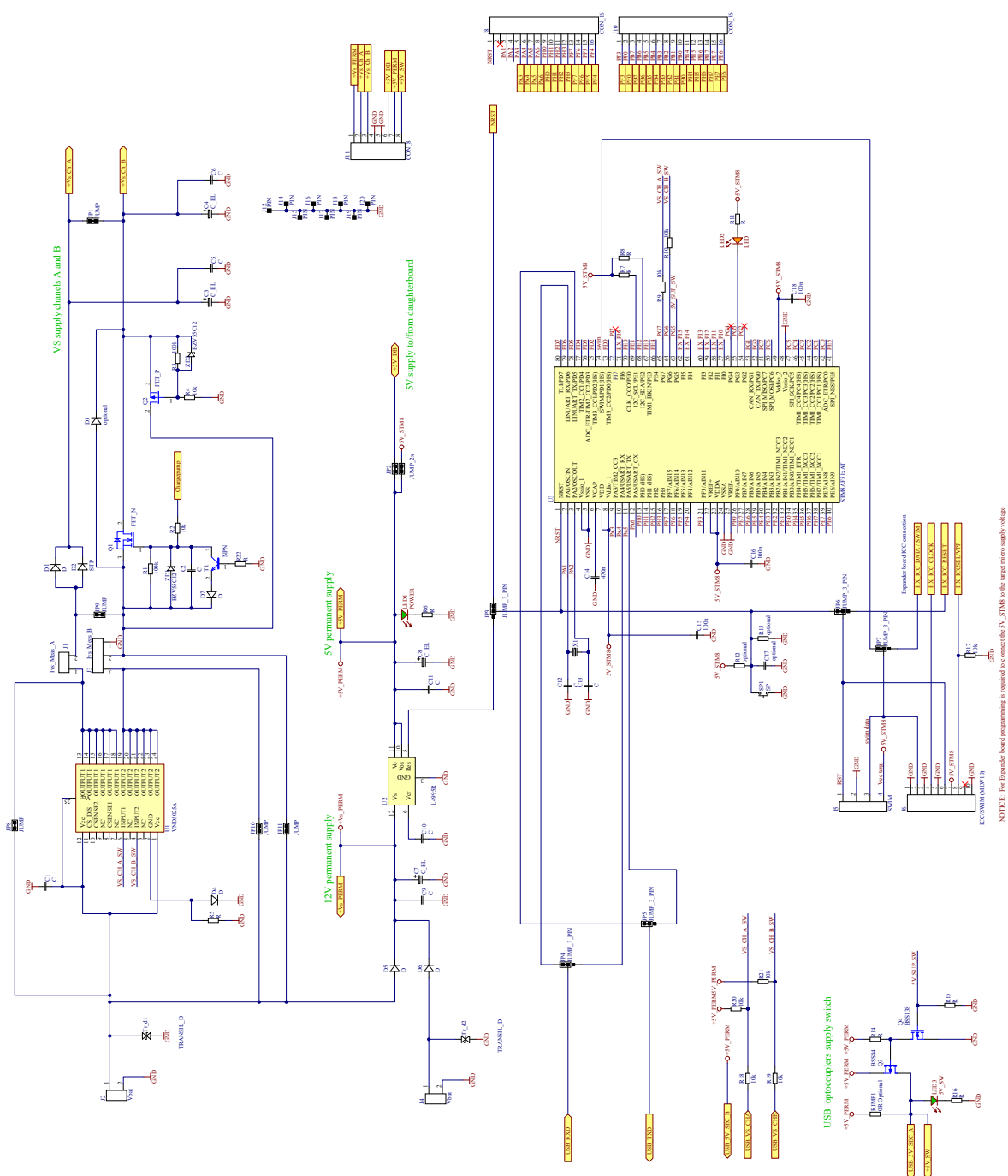
Figure 3. STM8 Uni Board - I/O and body


Figure 4. STM8 Uni Board - USB interface





NOTE: For Fowler band measurement is required to connect the 5V STMS to the target micro sample voltage

2.3 Daughterboard schematic

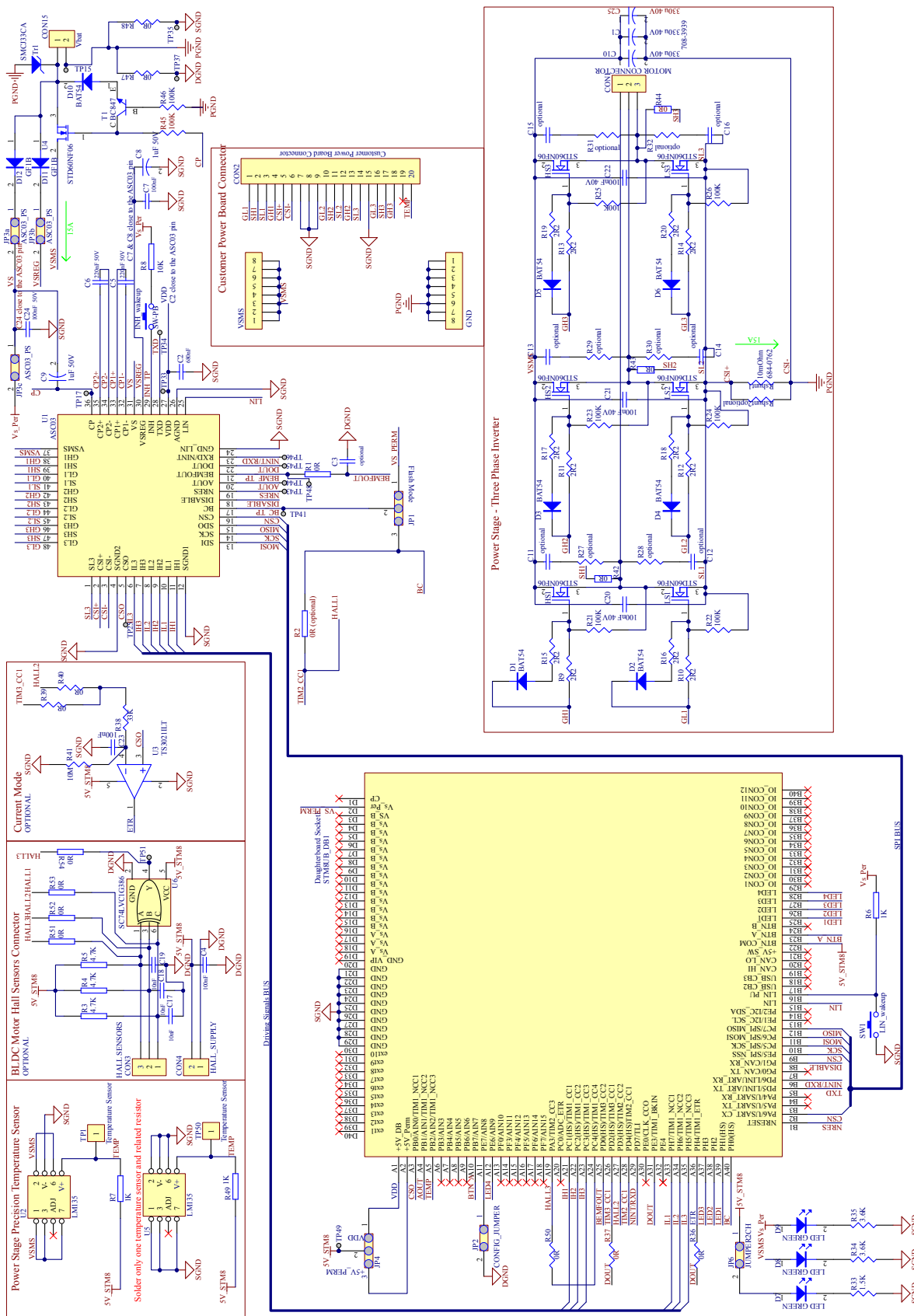
The [Figure 6](#) shows the schematic of the daughterboard.

In the daughterboard the following sections are present:

- 1 L99ASC03G and the components necessary for its functionality.
- 1 connector to the motherboard.
- 1 power stage temperature sensor: two stages are foreseen, only one is soldered.
- 1 BLCD motor hall sensors connector and its components, not soldered (optional).
- 1 current mode device and its components, not soldered (optional).
- 1 power stage - three phase inverter section: six power MOSFET are soldered, a connector to the external BLCD motor is foreseen.
- 3 customer power board connectors.

The schematic and BOM of the daughterboard can be found on the ST website.

Figure 6. EVAL-L99ASC03 daughterboard schematic



2.4 Motherboard layout

The EVAL-L99ASC03 motherboard was designed in a 2 layers board. Motherboard Top and Bottom layers are shown in Figure 7 and Figure 8. Gerber files of the motherboard can be found in the ST website.

Figure 7. Assembly Top

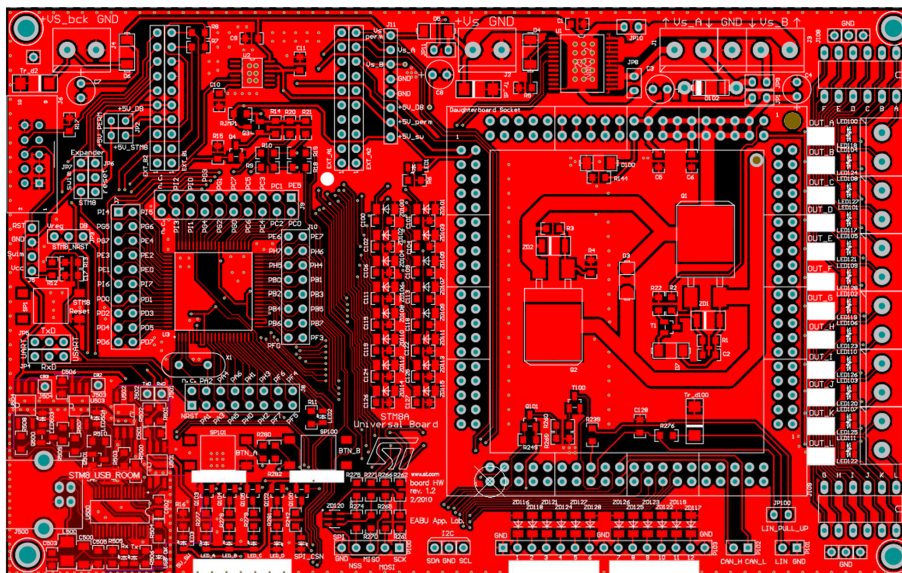
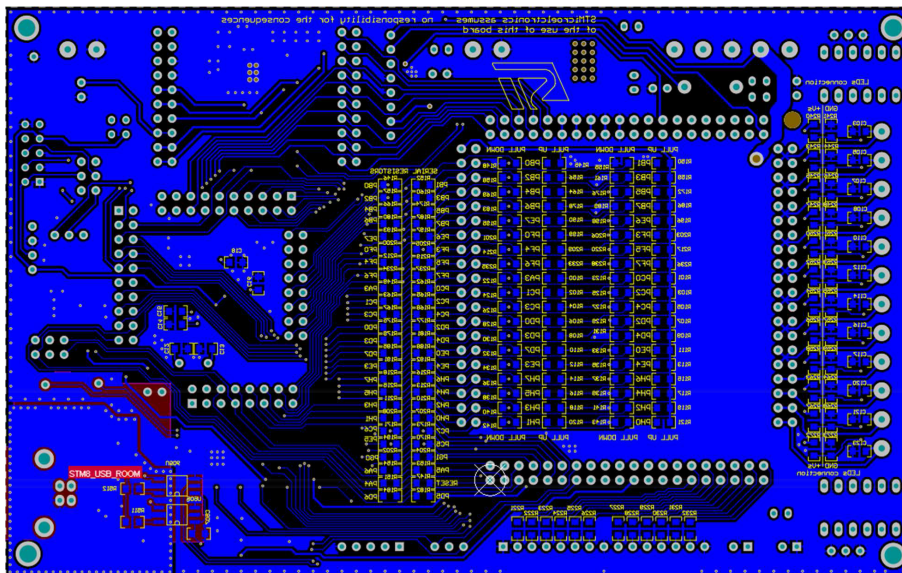


Figure 8. Assembly Bottom



2.5 Daughterboard layout

Different choice regarding the number of the layers can be used. A two-layers or an N-layers (where N can be 3 or 4) application board can be used to develop the board for the L99ASC03G application.

The EVAL-L99ASC03 daughterboard was designed in a 2 layers board because:

- A 2-layers design typically requires a little more care with the PCB routing but can be successfully implemented for a low number of tracks. The power supply trace on the component is made quite thick to present as low as impedance trace possible. Large areas of ground on the side of the board provide a low impedance path for the decoupling.
- A 2-layers PCB is cheaper to manufacture than a 3 or 4 layers solution.

The Top and Bottom layers are shown in the following figures. Gerber files of the daughterboard can be found in the ST website.

Figure 9. Assembly Top

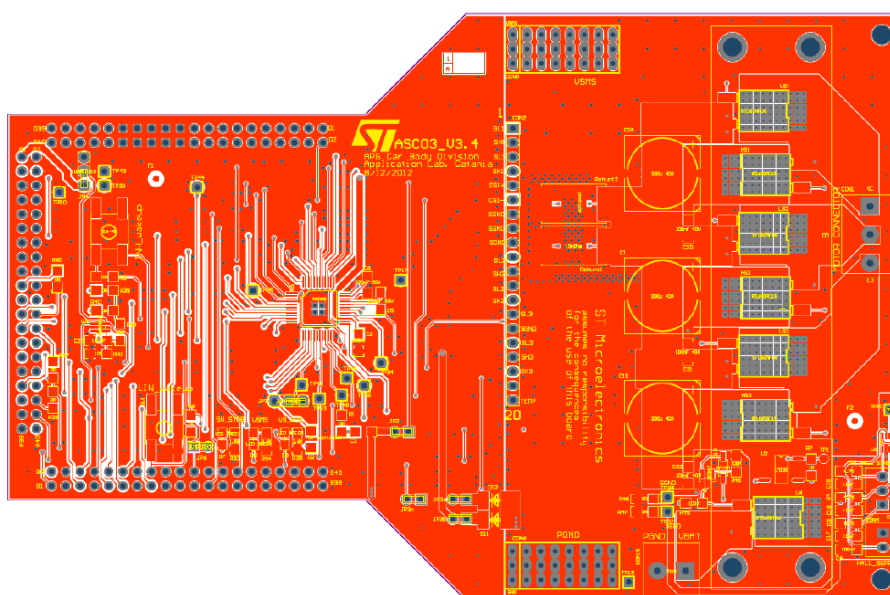
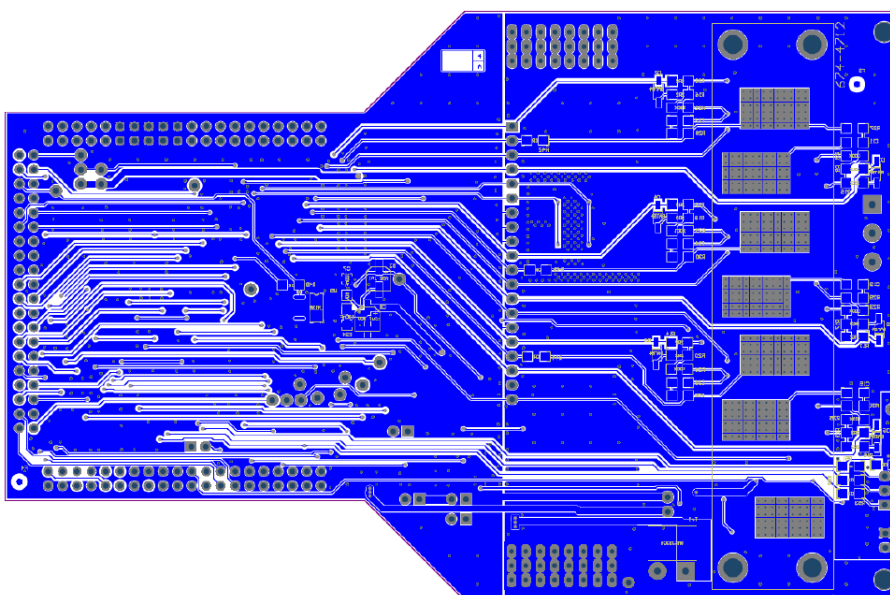


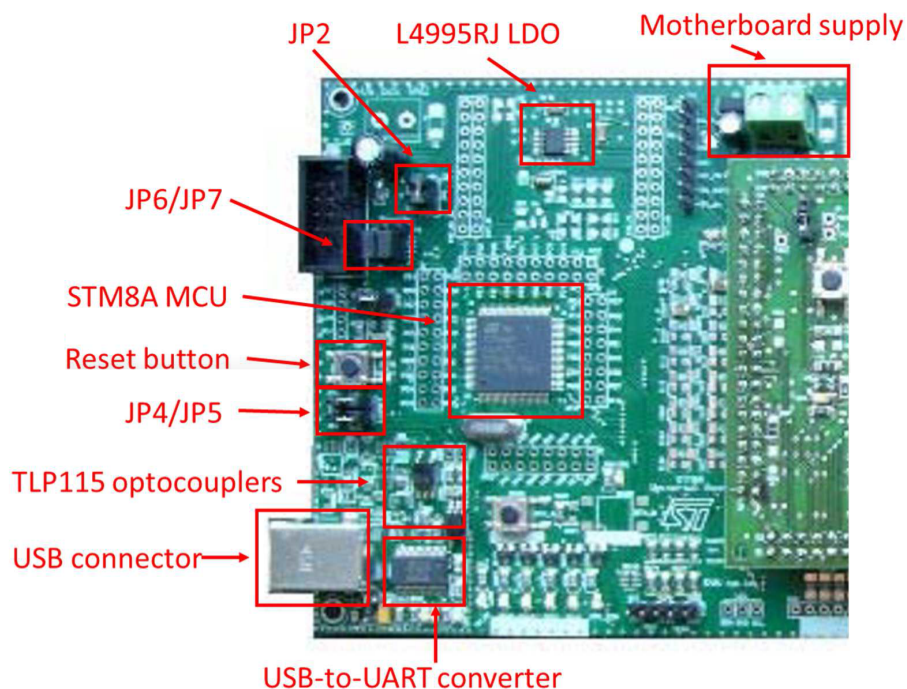
Figure 10. Assembly Bottom



2.6 Board connection and setup

The Figure 11 shows the placement of the components on the motherboard. Also, the placement of the connectors to be used for supplying the evaluation board and connecting with a host PC through USB cable are shown.

Figure 11. Motherboard section

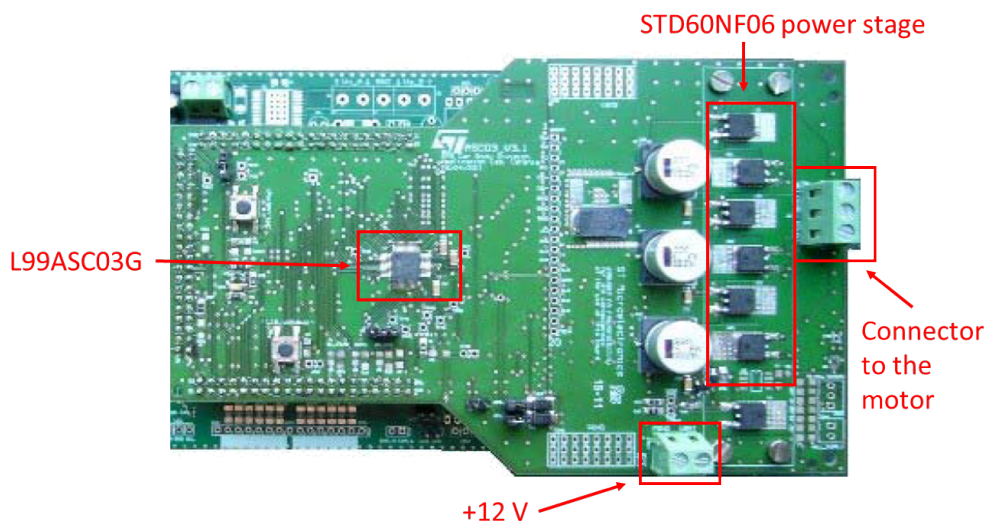


The placement of the components of the daughterboard is shown in Figure 12.

The main components of the daughterboard are:

- L99ASC03G.
- STD60NF06 power stage.
- Connector to the motor.
- Connector to the supply voltage.

Figure 12. Daughterboard section



Jumpers of the motherboard are already set in their default position.

Table 1. Motherboard jumper configuration

Jumper	Description	Default position
JP2	+5 V_DB	Not present
JP2	+5 V_STM8	Present
JP4	RxD	USART
JP5	TxD	USART
JP6	Reset	STM8
JP7	Swim	STM8

Table 2. Daughterboard jumper configuration

Jumper	Description	Default position
JP3a	ASC03_PS - VS	Present
JP3b	ASC03_PS - VSREG	Present
JP3c	ASC03_PS - Vs_Per	Not present

Revision history

Table 3. Document revision history

Date	Version	Changes
24-Jan-2022	1	Initial release.

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