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## How to use the EVAL-L99MOD5xXP evaluation kit

### Introduction

This document describes the STSW-L99MOD5xXP graphical user interface (GUI) dedicated to set and control the EVAL-L99MOD5xXP family evaluation kit.

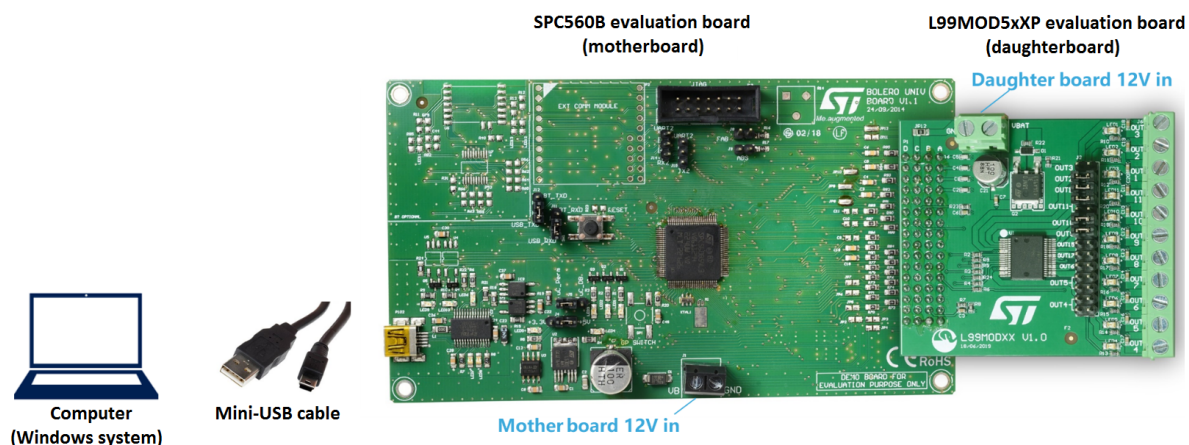
The EVAL-L99MOD5xXP evaluation kit consists in a motherboard and a daughterboard on which the L99MOD5xXP device is assembled. Both of these evaluation boards provide electronic control modules with enhanced power management functionalities including a standby mode. These evaluation boards are designed to drive multiple brushed DC motors and additional loads in high-side configuration, such as bulbs, LEDs or protected supply.

The STSW-L99MOD5xXP has been developed using C++ and works with a motherboard based on an SPC560B microcontroller which is programmed with a dedicated firmware to drive the specific L99MOD5xXP device assembled on the daughterboard.

## 1 Evaluation kit connection

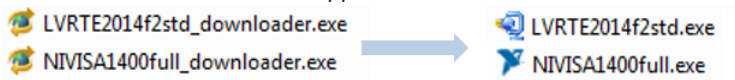
The following figure shows how to connect the evaluation kit.

Figure 1. Evaluation kit connection



## 2 Evaluation kit installation

To install the evaluation kit, follow the instructions below:

1. Install the VISA and Run-Time Engine drivers on the computer running the demo tool. Run the two downloaders below from the supplier's website to download and install the drivers:  

2. Install the FTDI driver from the supplier's website.
3. Complete the connection as [Figure 1. Evaluation kit connection](#) shows, then power on the kit.
4. Run the “**L99MOD5x.exe**” and select the appropriate device from the list.
5. If you receive a communication error message, select the correct serial port manually according to your setup.
6. Once the correct serial port is selected, the GUI will return the firmware version message.

### 3 Description of the graphical user interface

The following figures present the main windows of the graphical user interface.

Figure 2. Device selection

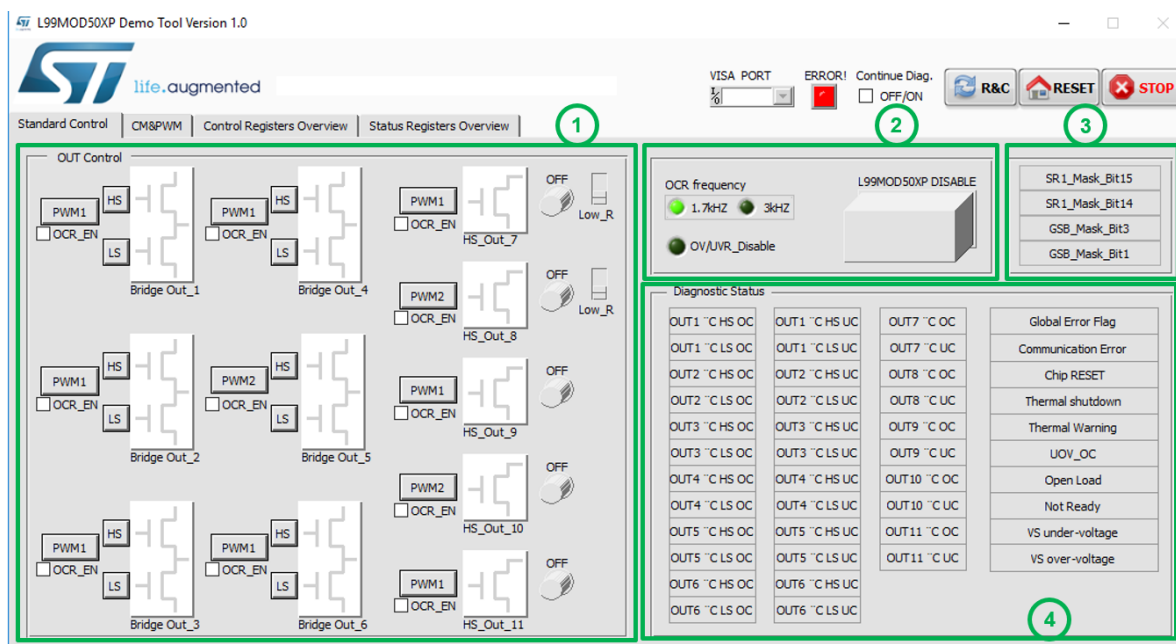


Figure 3. Common commands

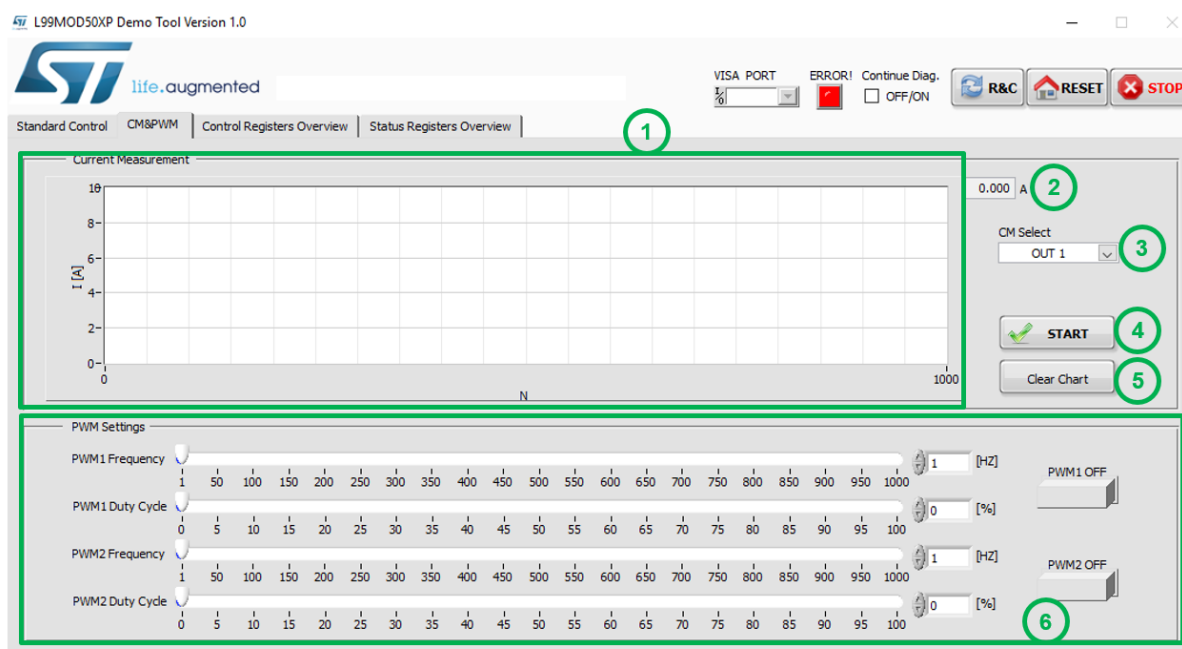


1. Selection tabs
2. VISA Port: please select the appropriate serial port
3. Check sum mark: in case the checksum is correct, "OK" is displayed; otherwise, the indicator turns red and "ERROR" is displayed
4. Continue Diagnose: if this option is checked, the GUI reads the status register continuously.
5. Read and Clear (R&C): when you click this button, the GUI will read and clear the status register once.
6. Reset: click this button to restore the GUI to the initial state
7. Stop: click this button to exit the GUI

Figure 4. Standard control tab



1. OUT Control: half-bridge, high-side outputs control
2. Enable device button
3. Configuration registers settings
4. Diagnostic Status: if any of these states occur, the corresponding status display will become red. Once the control register changes, the status register and all diagnostic information will be updated once.

**Figure 5. Current monitor and PWM tab**


1. Current value display window
2. Current value
3. Current detection select output
4. Current monitor start button
5. Clear window value button
6. PWM configuration: on/off, frequency and duty cycle settings

Figure 6. Control registers overview tab

L99MOD50XP Demo Tool Version 1.0

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VISA PORT: 1/0 ERROR! Continue Diag. OFF/ON

R&C RESET STOP

Standard Control CM&PWM Control Registers Overview Status Registers Overview

| Control Register 0 |                |   | Control Register 1 |                 |   | Control Register 2 |                    |   | Control Register 3 |                   |   | Configuration Register |                |   |
|--------------------|----------------|---|--------------------|-----------------|---|--------------------|--------------------|---|--------------------|-------------------|---|------------------------|----------------|---|
| Address: 0x00      |                |   | Address: 0x01      |                 |   | Address: 0x02      |                    |   | Address: 0x03      |                   |   | Address: 0x3F          |                |   |
| 15                 | OUT1-HS_on/off | 0 | 15                 | OUT7-HS1_on/off | 0 | 15                 | OUT1 °C OCR_enable | 0 | 15                 | OUT7-OCR_enable   | 0 | 15                     | Res            | 0 |
| 14                 | OUT1-LS_on/off | 0 | 14                 | OUT7-HS2_on/off | 0 | 14                 | OUT2 °C OCR_enable | 0 | 14                 | OUT8-OCR_enable   | 0 | 14                     | Res            | 0 |
| 13                 | OUT2-HS_on/off | 0 | 13                 | OUT8-HS1_on/off | 0 | 13                 | OUT3 °C OCR_enable | 0 | 13                 | OUT9-OCR_enable   | 0 | 13                     | Res            | 0 |
| 12                 | OUT2-LS_on/off | 0 | 12                 | OUT8-HS2_on/off | 0 | 12                 | OUT4 °C OCR_enable | 0 | 12                 | OUT10-OCR_enable  | 0 | 12                     | Res            | 0 |
| 11                 | OUT3-HS_on/off | 0 | 11                 | OUT9-HS_on/off  | 0 | 11                 | OUT5 °C OCR_enable | 0 | 11                 | OUT11-OCR_enable  | 0 | 11                     | Res            | 0 |
| 10                 | OUT3-LS_on/off | 0 | 10                 | OUT10-HS_on/off | 0 | 10                 | OUT6 °C OCR_enable | 0 | 10                 | OUT7-PWM1_enable  | 0 | 10                     | Res            | 0 |
| 9                  | OUT4-HS_on/off | 0 | 9                  | OUT11-HS_on/off | 0 | 9                  | Res                | 0 | 9                  | OUT8-PWM2_enable  | 0 | 9                      | Res            | 0 |
| 8                  | OUT4-LS_on/off | 0 | 8                  | Res             | 0 | 8                  | Res                | 0 | 8                  | OUT9-PWM1_enable  | 0 | 8                      | Res            | 0 |
| 7                  | OUT5-HS_on/off | 0 | 7                  | Res             | 0 | 7                  | OUT1-PWM1_enable   | 0 | 7                  | OUT10-PWM2_enable | 0 | 7                      | Res            | 0 |
| 6                  | OUT5-LS_on/off | 0 | 6                  | Res             | 0 | 6                  | OUT2-PWM1_enable   | 0 | 6                  | OUT11-PWM1_enable | 0 | 6                      | Res            | 0 |
| 5                  | OUT6-HS_on/off | 0 | 5                  | Res             | 0 | 5                  | OUT3-PWM1_enable   | 0 | 5                  | OCR_frequency     | 0 | 5                      | SR1_Mask_Bit15 | 0 |
| 4                  | OUT6-LS_on/off | 0 | 4                  | Res             | 0 | 4                  | OUT4-PWM1_enable   | 0 | 4                  | OV_UVR_disable    | 0 | 4                      | SR1_Mask_Bit14 | 0 |
| 3                  | Res            | 0 | 3                  | Res             | 0 | 3                  | OUT5-PWM1_enable   | 0 | 3                  | CM_select_bit_3   | 0 | 3                      | GSB_Mask_Bit3  | 0 |
| 2                  | Res            | 0 | 2                  | Res             | 0 | 2                  | OUT6-PWM1_enable   | 0 | 2                  | CM_select_bit_2   | 0 | 2                      | Res            | 0 |
| 1                  | Res            | 0 | 1                  | Res             | 0 | 1                  | Res                | 0 | 1                  | CM_select_bit_1   | 0 | 1                      | GSB_Mask_Bit1  | 0 |
| 0                  | Enable         | 0 | 0                  | Res             | 0 | 0                  | Res                | 0 | 0                  | CM_select_bit_0   | 0 | 0                      | Res            | 0 |
| 0x0                |                |   | 0x0                |                 |   | 0x0                |                    |   | 0x0                |                   |   | 0x0                    |                |   |

It is possible to write directly in the register by clicking on the desired bit, as shown in Figure 6. Control registers overview tab.

Figure 7. Status registers overview tab

L99MOD50XP Demo Tool Version 1.0

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VISA PORT: 1/0 ERROR! Continue Diag. OFF/ON

R&C RESET STOP

Standard Control CM&PWM Control Registers Overview Status Registers Overview

| Status Register 0 |               |   | Status Register 1 |               |   | Status Register 2 |                  |   | Global Status Register   |         |   |
|-------------------|---------------|---|-------------------|---------------|---|-------------------|------------------|---|--|---------|---|
| Address: 0x10     |               |   | Address: 0x11     |               |   | Address: 0x12     |                  |   |  |         |   |
| 15                | OUT1 °C HS_OC | 0 | 15                | OUT1 °C HS_UC | 0 | 15                | OUT7 °C OC       | 0 | 7  | GL_ER   | 0 |
| 14                | OUT1 °C LS_OC | 0 | 14                | OUT1 °C LS_UC | 0 | 14                | OUT7 °C UC       | 0 | 6  | CO_ER   | 0 |
| 13                | OUT2 °C HS_OC | 0 | 13                | OUT2 °C HS_UC | 0 | 13                | OUT8 °C OC       | 0 | 5  | C_RESET | 0 |
| 12                | OUT2 °C LS_OC | 0 | 12                | OUT2 °C LS_UC | 0 | 12                | OUT8 °C UC       | 0 | 4  | TSD     | 0 |
| 11                | OUT3 °C HS_OC | 0 | 11                | OUT3 °C HS_UC | 0 | 11                | OUT9 °C OC       | 0 | 3  | TW      | 0 |
| 10                | OUT3 °C LS_OC | 0 | 10                | OUT3 °C LS_UC | 0 | 10                | OUT9 °C UC       | 0 | 2  | UOV_OC  | 0 |
| 9                 | OUT4 °C HS_OC | 0 | 9                 | OUT4 °C HS_UC | 0 | 9                 | OUT10 °C OC      | 0 | 1  | OL      | 0 |
| 8                 | OUT4 °C LS_OC | 0 | 8                 | OUT4 °C LS_UC | 0 | 8                 | OUT10 °C UC      | 0 | 0  | NR      | 0 |
| 7                 | OUT5 °C HS_OC | 0 | 7                 | OUT5 °C HS_UC | 0 | 7                 | OUT11 °C OC      | 0 | 0x0  |         |   |
| 6                 | OUT5 °C LS_OC | 0 | 6                 | OUT5 °C LS_UC | 0 | 6                 | OUT11 °C UC      | 0 | SPI History  |         |   |
| 5                 | OUT6 °C HS_OC | 0 | 5                 | OUT6 °C HS_UC | 0 | 5                 | Res              | 0 | <div style="border: 1px solid black; height: 100px; width: 100%;"></div> |         |   |
| 4                 | OUT6 °C LS_OC | 0 | 4                 | OUT6 °C LS_UC | 0 | 4                 | Res              | 0 |  |         |   |
| 3                 | Res           | 0 | 3                 | Res           | 0 | 3                 | VS_under_voltage | 0 |  |         |   |
| 2                 | Res           | 0 | 2                 | Res           | 0 | 2                 | VS_over_voltage  | 0 |  |         |   |
| 1                 | Res           | 0 | 1                 | Res           | 0 | 1                 | Res              | 0 | <div style="border: 1px solid black; height: 20px; width: 100%;"></div>  |         |   |
| 0                 | Res           | 0 | 0                 | Res           | 0 | 0                 | Res              | 0 |  |         |   |
| 0x0               |               |   | 0x0               |               |   | 0x0               |                  |   | Clear History  |         |   |

1. Status Registers: SR0...SR2: it is possible to read and clear all status registers once or read them continuously. Once the control register changes, the status register and all diagnostic information will be updated once.
2. Global Status Register: this is device-dependant.
3. SPI History: the SPI commands sent to the device are recorded here.
4. Clear History: it clears the SPI history.
5. Continue Diagnose: if this option is checked, the GUI reads the status register continuously.
6. Read and Clear (R&C): when you click this button, the GUI will read and clear the status register once.



## Revision history

**Table 1. Document revision history**

| Date        | Version | Changes       |
|-------------|---------|---------------|
| 20-Nov-2019 | 1       | First release |

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