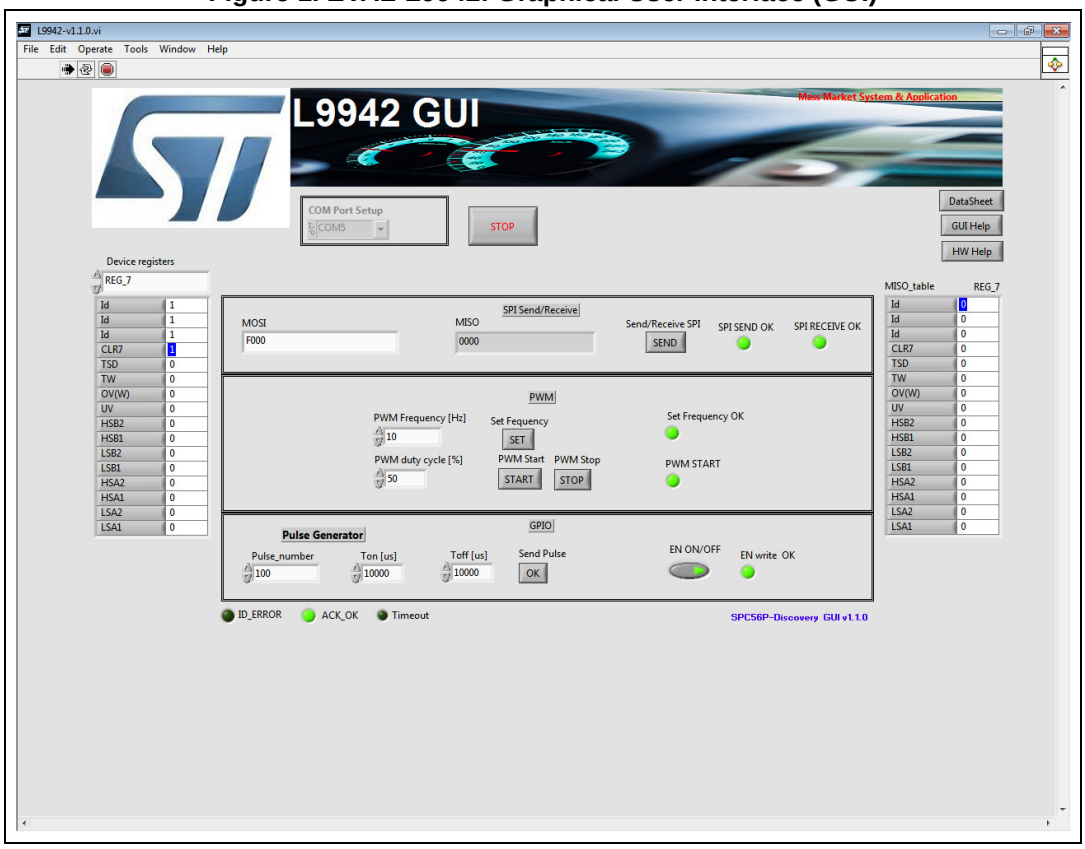
UM1947
User manual

EVAL-L9942 Graphical User Interface

Introduction

This document describes the Graphical User Interface (GUI) to initiate and control the EVAL-L9942 (Stepper Motor Driver application boards for L9942). The GUI allows to modify the parameters through the SPI protocol, to manage the enable, DIR pins and generate the pulse signal.

Figure 1. EVAL-L9942: Graphical User Interface (GUI)



The L9942 GUI has been developed by using Labview® and it must be used with the EVAL-L9942 evaluation board in conjunction to the SPC56P-Discovery evaluation board SPC560P-DISP.

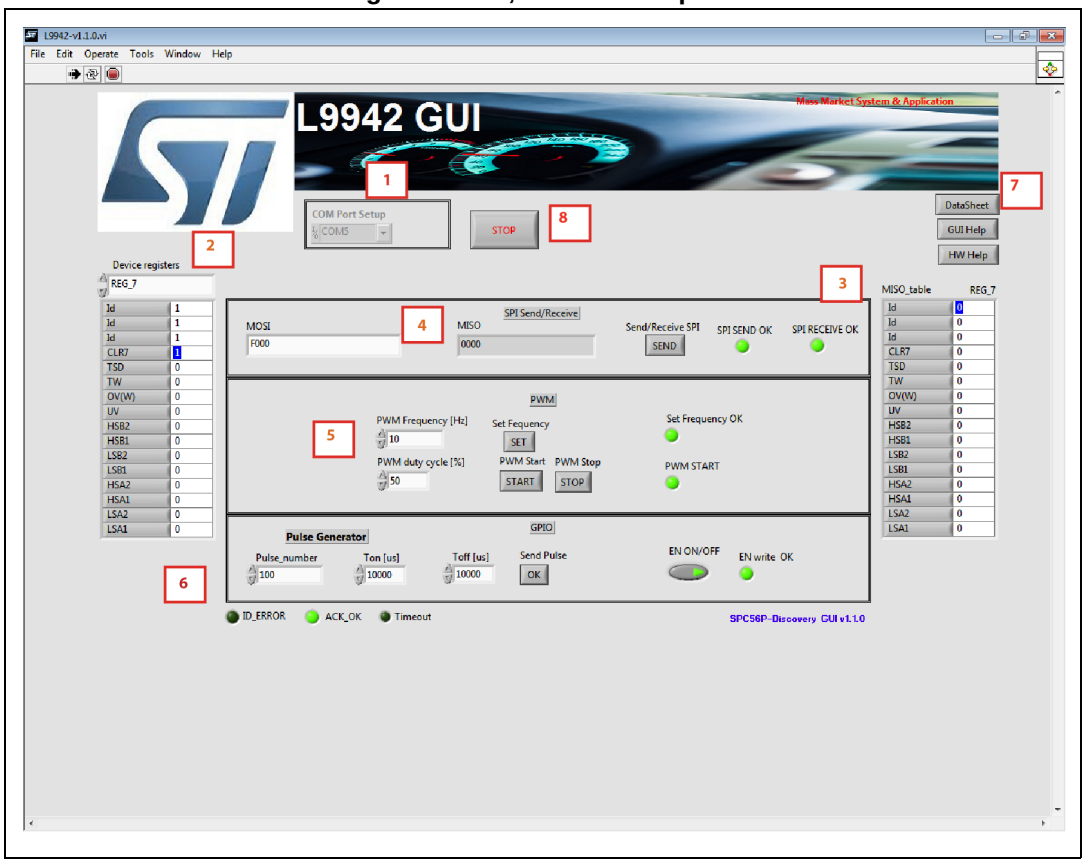
Contents

List of figures

1 Graphical User Interface description

The L9942 GUI includes eight fields:

Figure 2. GUI, fields description



1. **Com Port Setup:** this menu allows to select the COM port.
2. **SDI:** through this menu it is possible to select the specific device register and program the bits
3. **SDO:** through this menu it is possible to read the device SDO register.
4. **SPI Send/Receive:** in this area, pushing the [SEND] button, it is possible to send the SPI command configured in the SDI menu(menu #2) or directly send an SPI command manually and then send the command programmed in the MOSI field. In the same menu it is possible to read the SPI message from the device (MISO).
   The two LEDs, SPI SEND OK and SPI RECEIVE OK show the status of the SPI communication. If the LED is turned ON the communication is established and the data is transferred properly.
5. **PWM:** through this menu it is possible to enable the PWM generator. The PWM frequency as well as the duty cycle is programmable.
6. **GPIO:** through this menu it is possible to manage the **Pulse Generator** setting the number of pulses, the Ton and Toff. After pushing the [OK] button, the configured number of pulses is generated. In this menu it is possible to Enable /Disable the device.
7. **HELP:** through this menu it is possible to download the GUI, the HW help and the

L9942 datasheet.

8. **CLOSE:** push this button to stop the execution of the GUI.

2 Running procedure

2.1 Running procedure using PWM

Here below there is a list of commands the user must follow to drive the EVAL-L9942 using the GUI and PWM generator:

1. Configure the COM port
2. Press “OK”
3. To enable the Device (EN), press the “EN ON/OFF” button in field #6. If the communication has been established, and the command have been sent properly, the led “SEND ENABLE OK” is turned ON (red). The led D1, on the EVAL-L9942, is turned ON as well.
4. Write the desired value of the SPI in the field #2
5. Press “SEND” in the field #4. If the communication has been established, and the command has been sent properly, the LED “SPI SEND OK” is turned ON (red color). The led “SPI RECEIVE OK” is turned ON if the answer from the device has been properly received.
6. In field #3 it is possible to read the answer from the device in bit format; in field #4 SDI and SDO data are shown (expressed in hex).
7. In field #6, set the Pulse Number the Ton [us] and Toff [us].
8. In field #6 press “OK” [Send Pulse], if the set values are correct and comply with the characteristics of the motor it will start for the set pulses.
9. When the set number of Pulse are completed, the motor stop.
10. The button “STOP” on the top side of the GUI stops the execution of Labview program
11. Press [x] on the right top side to close the window.

Note: To use the Step Generator a bridge between A21 and A22 must be made (for reference see EVAL-L9942 HW Manual see Section Appendix A: Document reference)

2.2 Running procedure using step clock

Here below there is a list of commands the user must follow to drive the EVAL-L9942 using the GUI and Step Clock generator:

1. Configure the COM port
2. Press “OK”
3. To enable the Device (EN), press the “EN ON/OFF” button in field #6. If the communication has been established, and the command have been sent properly, the led “SEND ENABLE OK” is turned ON (red). The led D1, on the EVAL-L9942, is turned ON as well.
4. Write the desired value of the SPI in the field #2
5. Press “SEND” in the field #4. If the communication has been established, and the command has been sent properly, the LED “SPI SEND OK” is turned ON (red color). The led “SPI RECEIVE OK” is turned ON if the answer from the device has been properly received.
6. In field #3 it is possible to read the answer from the device in bit format; in field #4 SDI

and SDO data are shown (expressed in hex).

7. In field #6, set the Pulse Number the Ton [us] and Toff [us].
8. In field #6 press “OK” [Send Pulse], if the set values are correct and comply with the characteristics of the motor it will start for the set pulses.
9. When the set number of Pulse are completed, the motor stop.
10. The button “STOP” on the top side of the GUI stops the execution of Labview program
11. Press [x] on the right top side to close the window.

Note: To use the Step Generator a bridge between A21 and A22 must be made (for reference see EVAL-L9942 HW Manual see Section Appendix A: Document reference)

3 SPC560P-DISP and EVAL-L9942 connection

SPC560P-DISP board has a connector 4 x 37 pin 100 mils where the EVAL-L9942 must be plugged. The user must pay attention to plug the EVAL-L9942 in the right position; *Figure 4: SPC560P-DISP – 4 x 36 Connector, pin "A-17"* and *Figure 5: SPC560P-DISP – 4 x 36 Connector, pins connected to EVAL-L9942* show how to identify the pins.

Figure 3. SPC560P-DISP

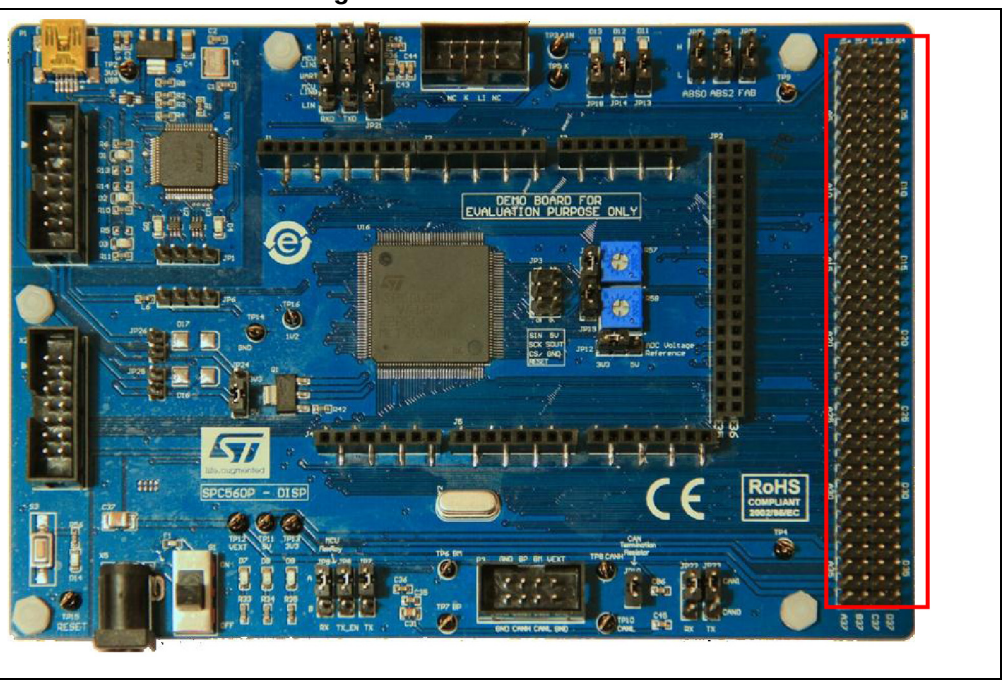


Figure 4. SPC560P-DISP – 4 x 36 Connector, pin "A-17"

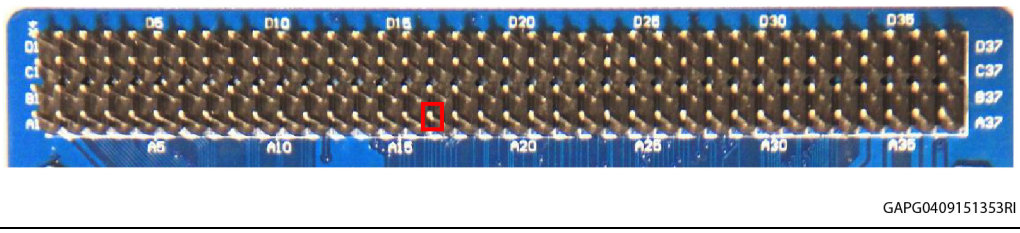


Figure 5. SPC560P-DISP – 4 x 36 Connector, pins connected to EVAL-L9942

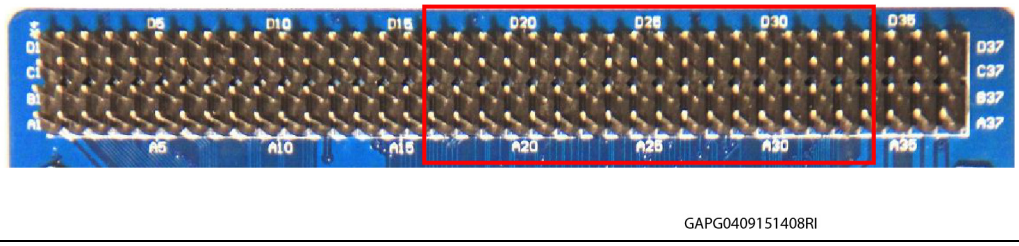


Figure 6. EVAL-L9942 and SPC560P-DISP

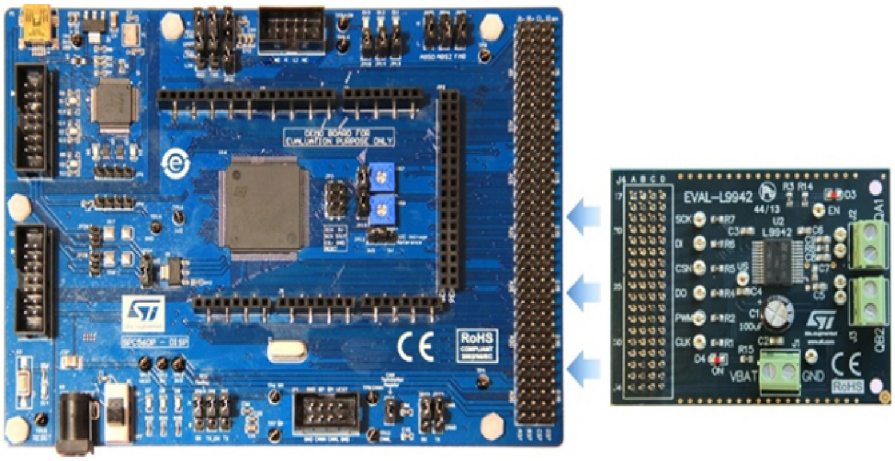
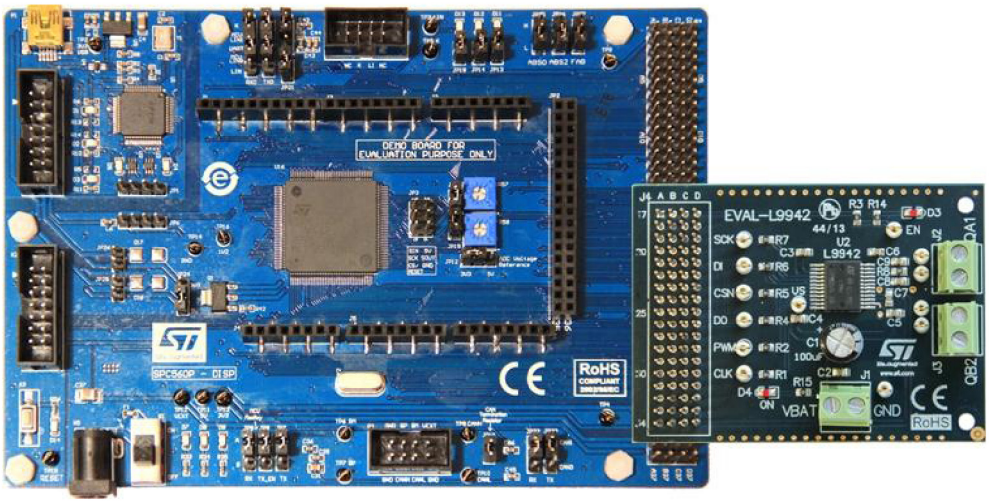


Figure 7. EVAL-L9942 and SPC560P-DISP plugged



4 SPC560P-DISP jumper configuration

The following jumper setup for SPC560P-DISP are recommended when using the EVAL-L9942 evaluation board with EVAL-L9942 Graphical User Interface:

Table 1. SPC560P-DISP jumper configuration

Jumper name	Type	Configuration
JP3	-	OPEN
JP4	-	UART=MCU LIN0
JP5	-	UART=MCU LIN0
JP7	-	A
JP8	-	A
JP9	-	A
JP10	-	ON
JP11	-	Master (Verso C42)
JP12	-	5 V or 3,3 V depending on the V_{CC} used for L9942
JP13	-	OPEN
JP14	-	OPEN
JP15	-	L
JP16	-	L
JP17	-	L
JP18	-	OPEN
JP19	-	ON
JP20	-	ON
JP21	-	ON
JP22	-	OPEN
JP23	-	OPEN
JP24	-	5 V or 3,3 V depending on the V_{CC} used for L9942
JP25	-	OPEN
JP26	-	OPEN

5 SPC56P-Discovery USB drivers installation guide

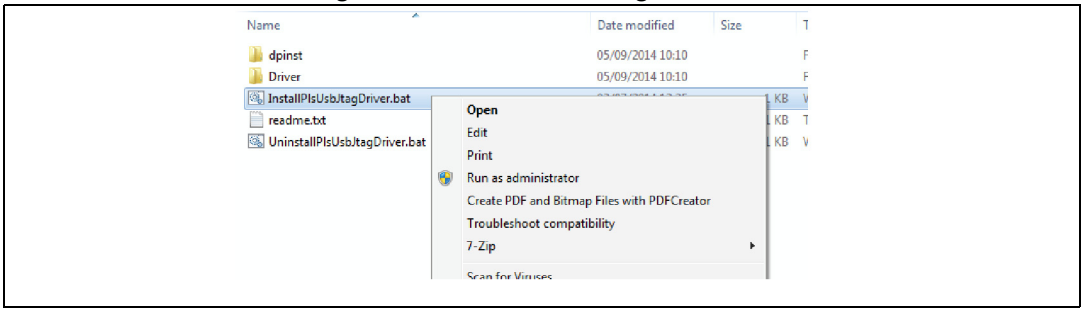
If the USB drivers are already installed, it is suggested to uninstall them and then follow the instructions reported below.

The USB connection provides the operating voltage to supply the board (no external PSU to supply the SPC560P-DISP is needed).

1. Disconnect the USB from SPC56P-DISP board and then open the folder "JtagUsbDriver".

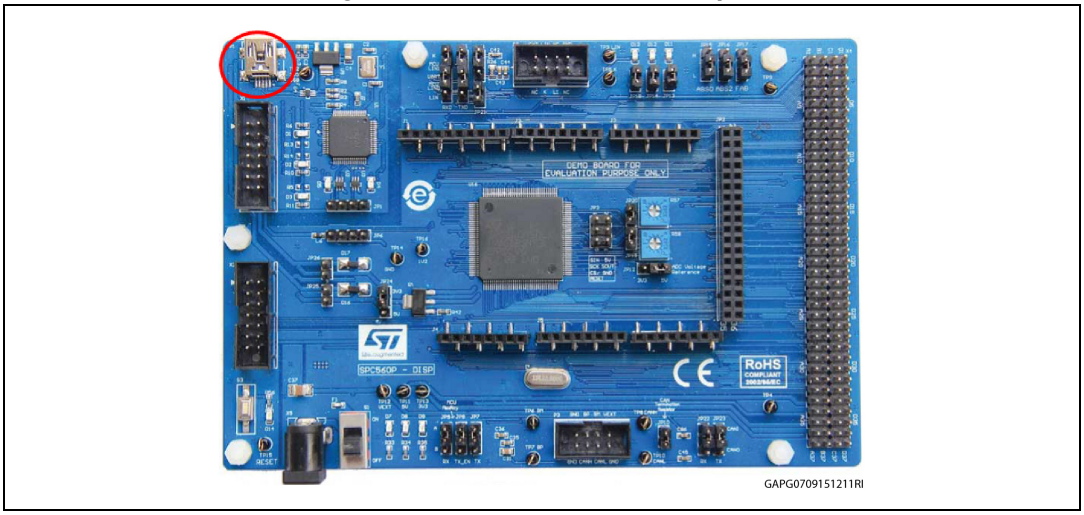
2. Right click on "InstallPlsUsbJtagDriver.bat" and then select "Run as administrator"

Figure 8. InstallPlsUsbJtagDriver.bat



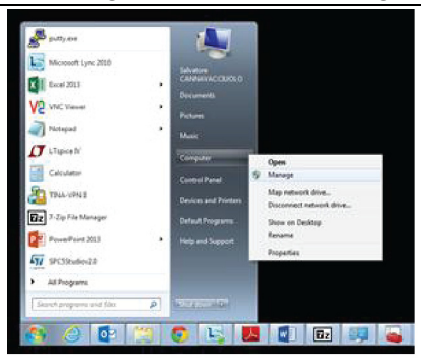
3. Once the installation is completed, connect the USB cable to the SPC56P-DISP board: the USB drivers are installed.

Figure 9. SPC560P-DISP – USB port



4. From "Start" Menu, right click on "Computer" and select "Manage".

Figure 10. Device Manager



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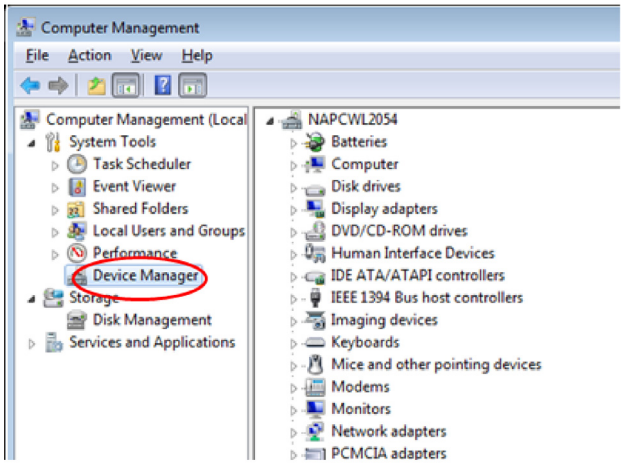
5. Once the computer management popup appears, select Device Manager from the System Tools menu.

Figure 11. Computer management



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6. Expand the item Universal Serial Bus controllers: the item “PLS USB JTAG Adapter for SPC5xxx A” and “PLS USB JTAG Adapter for SPC5xxx B” appears.

Figure 12. PLS USB JTAG Adapter for SPCxxx A & B

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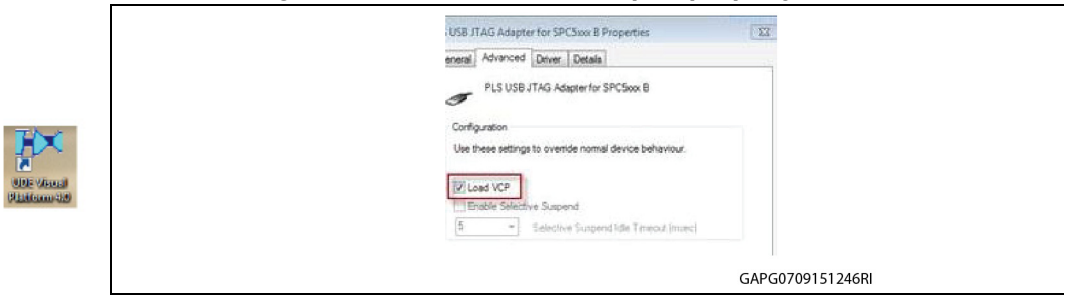
7. To enable the COM port, right click on “PLS USB JTAG Adapter for SPC5xxx B” (only this post) and then click on “Properties”. A new window pops up: select the tab

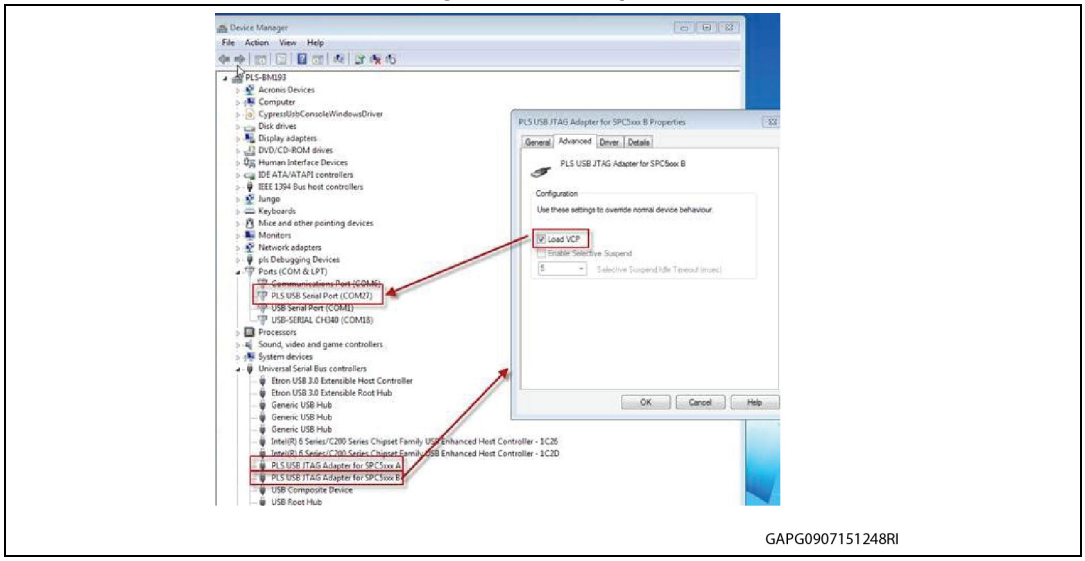
"Advanced" then flag the "LOAD VCP" (Virtual COM Port) box. This item should be already flagged, leave it as it is.

Figure 13. PLS USB JTAG adapter property



8. Click OK button to continue.
9. Disconnect the USB cable from the SPC56P-DISP and reconnect it.
10. A COM port is detected and a new driver automatically installed. From the Device Manager window check the new COM port available.

Figure 14. COM port



11. The COM port is now available on the SPC56P-DISP and the USB on the board can be used for serial communication with the PC.

Note: Once the USB cable is connected, either at points 3 or 9 of the procedure above, should Windows not automatically install the drivers, the manual installation is still possible using the path "…\JtagUsbDriver\driver".

6 Labview driver installation guide

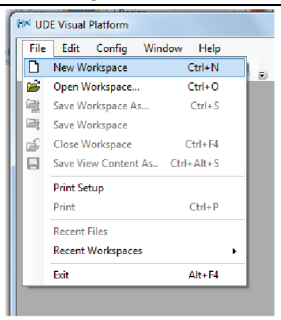
The L9942 GUI can be used Stand Alone, without a Labview license, by installing the free Runtime Engine for Labview 2013 and the VISA Runtime 5.4.

7 How to load the FW on SPC56P-DISP

In order to use the L9942 GUI the SPC560P-DISP must be programmed with a dedicated Firmware (named “GP-Pictus.elf”).

1. Start UDE Visual Platform 4.0x.
2. Create a new Workspace for SPC56P-DISP. Click File>New Workspace

Figure 15. New Workspace for SPC56P-DISP (part 1)



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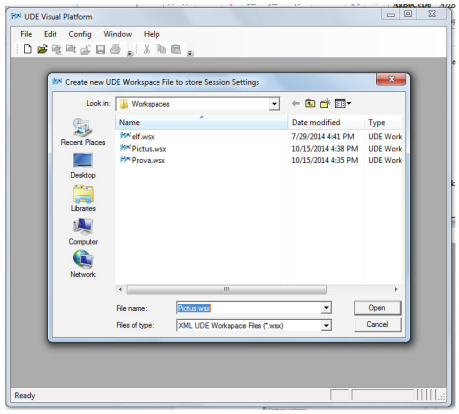
3. Name the new Workspace i.e. Pictus then select OPEN

Figure 16. New Workspace for SPC56P-DISP (part 2)



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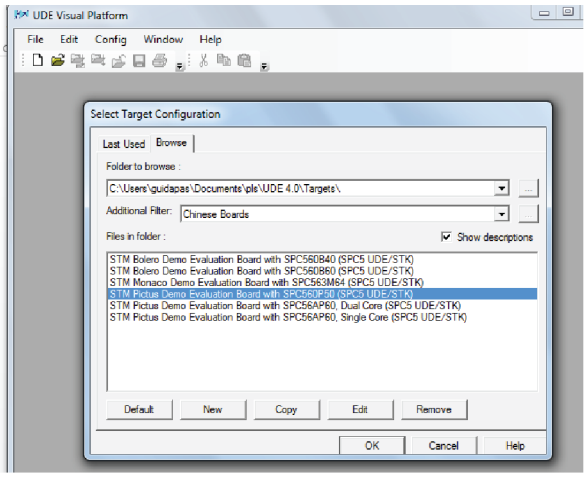
4. Select “STM Pictus Evaluation Board with SPC560P50 (SPC5 UDE/STK)” then click OK

Figure 17. STM Pictus Evaluation Board with SPC560P50 (SPC5 UDE/STK)



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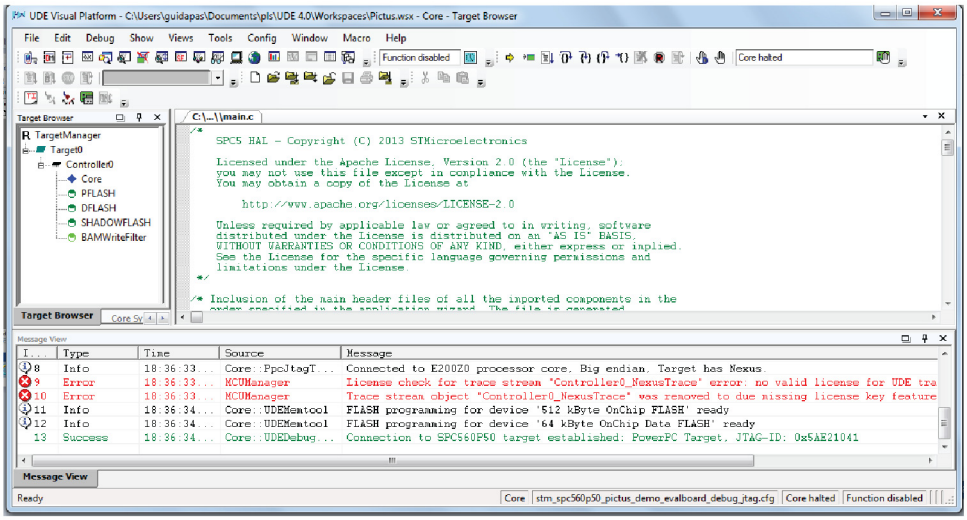
5. UDE Visual Platform 4.0 is refreshed and new functionalities available.

Figure 18. UDE Visual Platform 4.0 (part 1)



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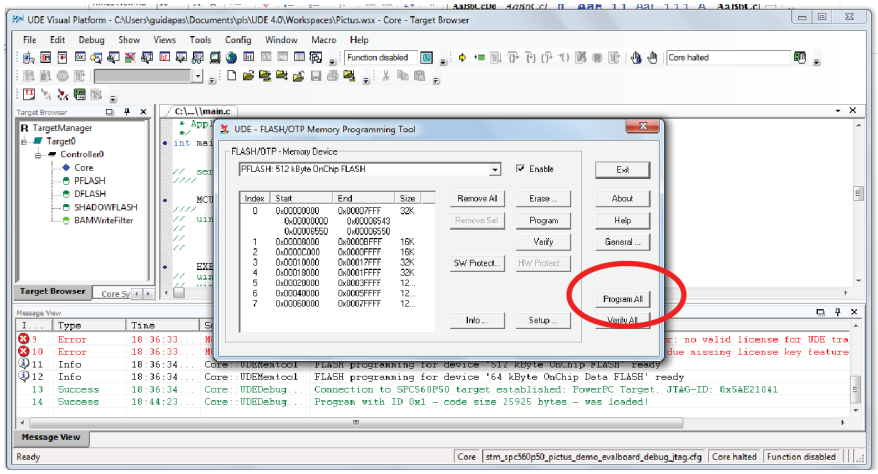
6. Click on “Load Program”, browse to find the file “GP-Pictus.elf “, click “Open” and in the next windows click on the button “Program All”

Figure 19. UDE Visual Platform 4.0 (part 2)



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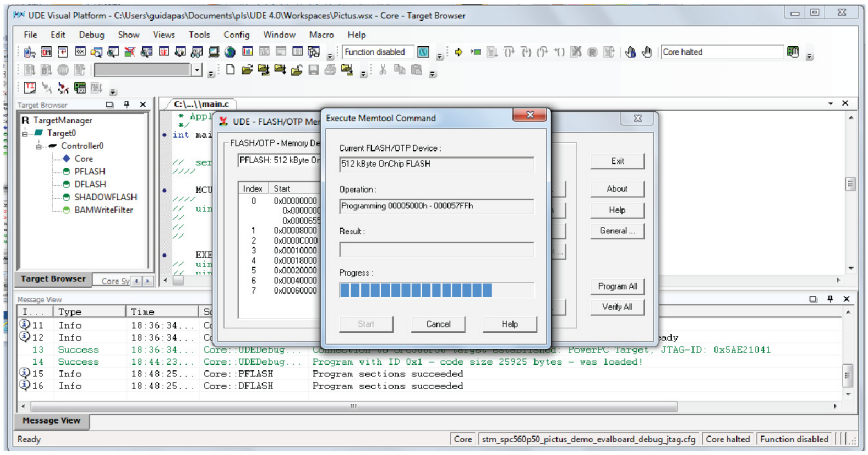
7. The procedure starts and its status is shown in a new window.

Figure 20. UDE Visual Platform 4.0 (part 3)



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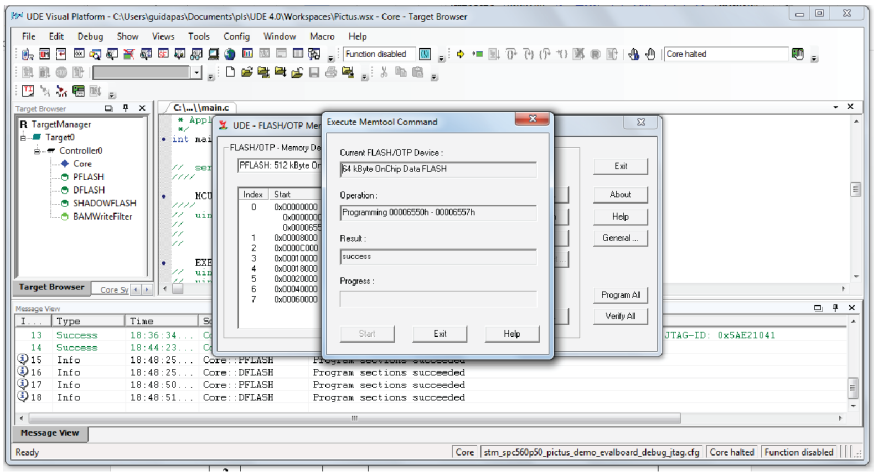
8. When the procedure is terminated click on “Exit” on all windows. The program procedure is finished and the SPC56P-DISP is ready to be used with the Graphical User Interface (GUI) for L9942.

Figure 21. UDE Visual Platform 4.0 (part 4)



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Appendix A Document reference

- *EVAL-L9942* (UM1707, DocID025691)

Revision history

Table 2. Document revision history

Date	Revision	Changes
24-Sep-2015	1	Initial release.
11-May-2016	2	Updated *Figure 1: EVAL-L9942: Graphical User Interface (GUI)* and *Figure 2: GUI, fields description*. Added *Section 2.1: Running procedure using PWM* and *Section 2.2: Running procedure using step clock*. Added *Section 4: SPC560P-DISP jumper configuration*.