# AN4321
Application note

Getting started with the SPC56L-Discovery

Introduction

SPC56L-Discovery evaluation kit is based on the 32-bit microcontrollers SPC56EL70L5.

The SPC56L-Discovery is an evaluation board supporting STMicroelectronics SPC56xL microcontrollers. The selected solution is the quickest way to discover the SPC56xL70 family, to program the device and to build and debug applications.

Figure 1. SPC56L-Discovery board with SPC56EL70L5
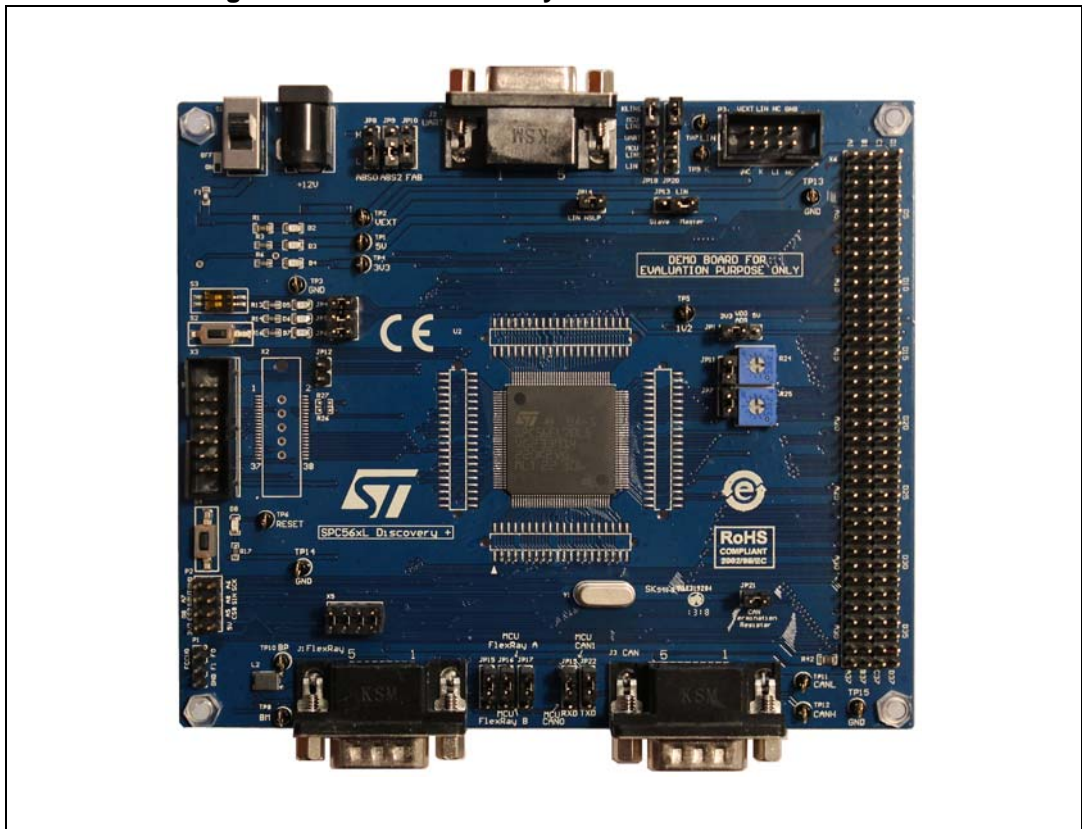
The evaluation board allows full access to all of the CPUs I/O signals, and the peripherals such as CAN, FlexRay, UART, JTAG, K-Line, LIN.

SPC56L-Discovery is supported by a specific Application Project inside SPC5Studio (a visual integrated software development environment to easily develop software for SPC56 MCU's), where micro start-up routine, I/O mapping and a simple test code examples have been already designed by STMicroelectronics experts.

SPC5Studio is available for download: www.st.com/spc5studio.

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1 Getting started

1.1 Delivery checklist

Your SPC56L-Discovery kit contains the following items:
- #1 SPC56EL70L5DISP evaluation board
- #1 Power supply output 12 V (plug with 12 VDC center positive, 2.1 mm inner diameter)

1.2 Setting up hardware and connections

To setup the hardware follow this procedure:
1. Remove the board and the PSU from the protective plastic envelops
2. Check the SPC56L-Discovery board and set S1 switch to 'OFF" position.
3. Connect the PSU to the mains. Note: a mains plug adapter (not include in the kit) can be used to connect the PSU Europlug to the local socket.
4. Plug the PSU cable in the X1 connector.
5. Set the S1 cursor to "ON"; the board is supplied.
6. The LEDs D2, D3 and D4 that means the voltage levels +12 V, +5 V and +3.3 V are present with proper level.
7. The LEDs D5, D6 and D7 are blinking and are showing the microcontroller is working properly[a].

1.3 How to connect an external adapter to the JTAG connector

The following procedure describes how to connect to, flash and debug the microcontroller using the JTAG. The procedure describes how to connect the dedicated PLS USB-JTAG adapter.
1. Turn off the board (Switch S1="OFF")
2. Connect the USB cable to the adapter.
3. Plug the USB cable to the PC (port USB 2.0 or higher).
4. Plug the adapter 14 pins female connector (2 x 7 pin) in X3 connector.
5. Turn on the board (Switch S1="ON").
6. The board is ready to be programmed with the user software.

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a. These LEDs are blinking because demo software has been loaded previously during the test board procedure.
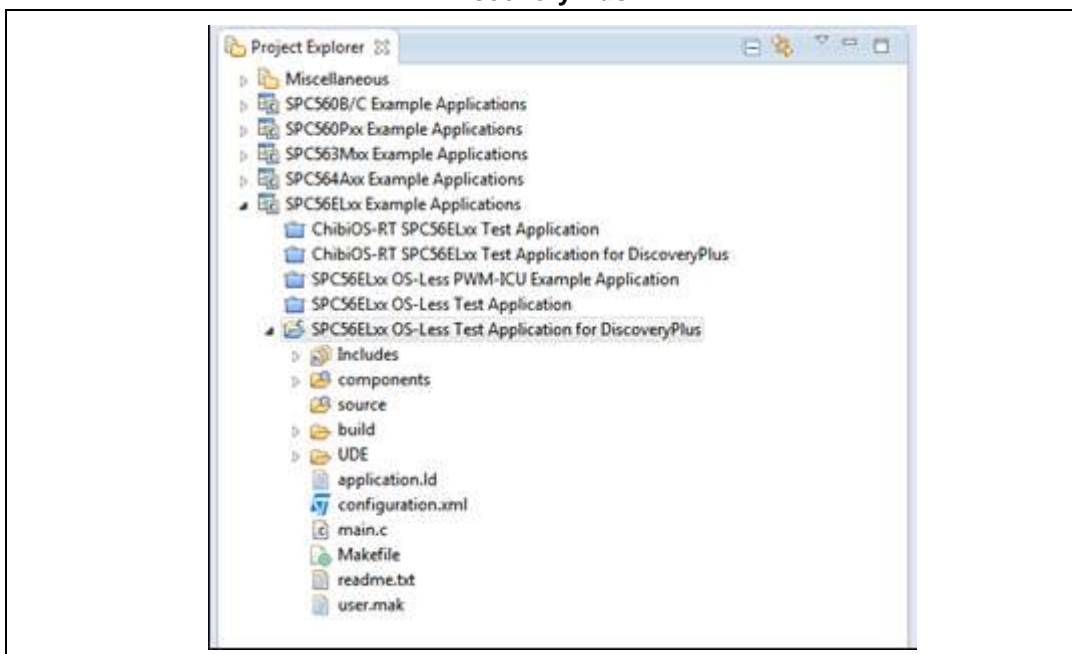
2 How to program the controller

2.1 Load a test program

The procedure to load a test program in the evaluation board is here below summarized:
1. Run SPC5Studio.
2. In Project Explorer tab open "SPC56ELxx Example Applications"

Figure 2. SPC5Studio - Project explorer –"SPC56ELxx OS-Less Test Application for DiscoveryPlus"

3. Select and open the project "SPC56ELxx OS-Less Test Application for DiscoveryPlus".
4. Build the project.
5. Select and open the UDE folder then click to "debug.wsx".
6. In the window "Load binary target file" pressing the "Load button", the file: "C:\SPC5Studio\workspace\SPC56ELxx OS-Less Test Application for DiscoveryPlus\build\out.elf" will be loaded from the workspace (see *Figure 3*).

Figure 3. UDE Visual Platform – Load binary target file
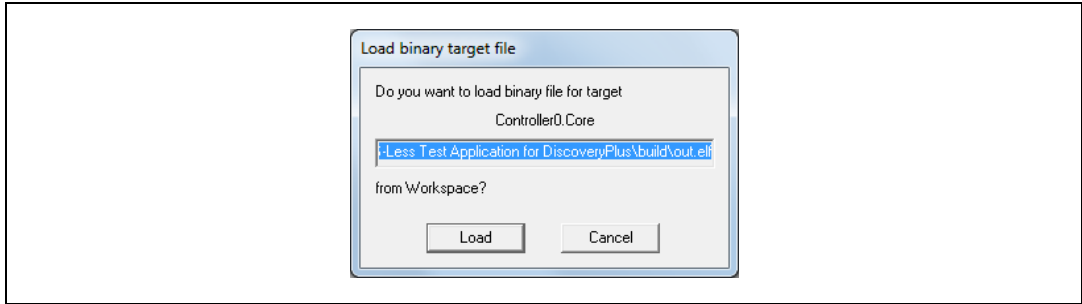
7. Press the button "Program All" (see *Figure 4*). The window reported in *Figure 5* shows the execution of the programming procedure

Figure 4. UDE Visual Platform - UDE - FLASH/OTP Memory Programming tool (part 1)

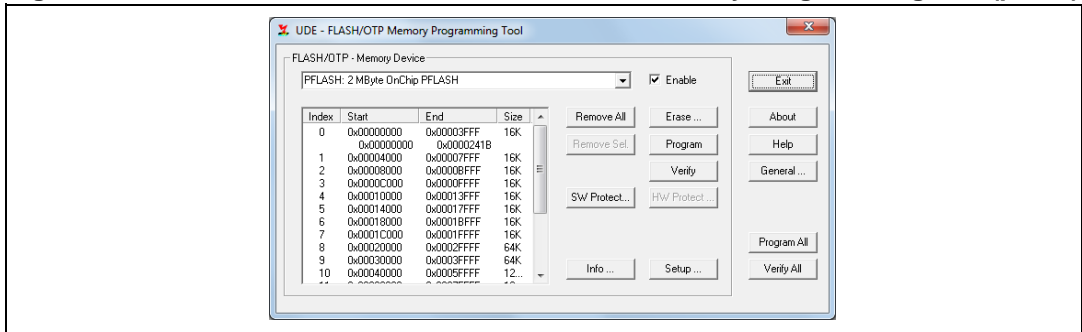**Figure 5. UDE Visual Platform - UDE - FLASH/OTP Memory Programming tool (part 2)**

8. Turn off the board then remove the PLS adpter.

9. Supply the board and push the Reset button.

10. Check the LEDs D5, D6 and D7: they must be blinking

The document UM1602 (see *Section Appendix B: Reference documents*) is focused to describe and to understand how to use the SPC5Studio to create, build and debug a project.

Appendix A   General handling precautions

The following precautions are recommended when using the SPC56L Discovery board:

1. Do not modify or manipulate the board when the DC supply is connected to the board.
2. Any equipment or tool used for any manipulation of the semiconductor devices or board modification should be shielded and connected to ground.
3. The connectors and cables should be plugged and removed when the board is off.
4. Do not supply the board with a DC source higher than 12 V.
5. Pay attention to the PSU DC power plug: it must be with 2.1 mm inner diameter and with positive connected to the center.
6. It is recommended to use antistatic tools.

Appendix B   Reference documents

- *SPC5Studio users guide* (User manual UM1602, DocID024185).

Revision history

Table 1. Revision history

Date	Revision	Changes
05-July-2013	1	Initial release.
05-Aug-2013	2	Update the title. Update *Figure 1*. Replaced RPN *SPC56EL70L5DISP* with *SPC56L-Discovery*.
17-Sep-2013	3	Updated Disclaimer.

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