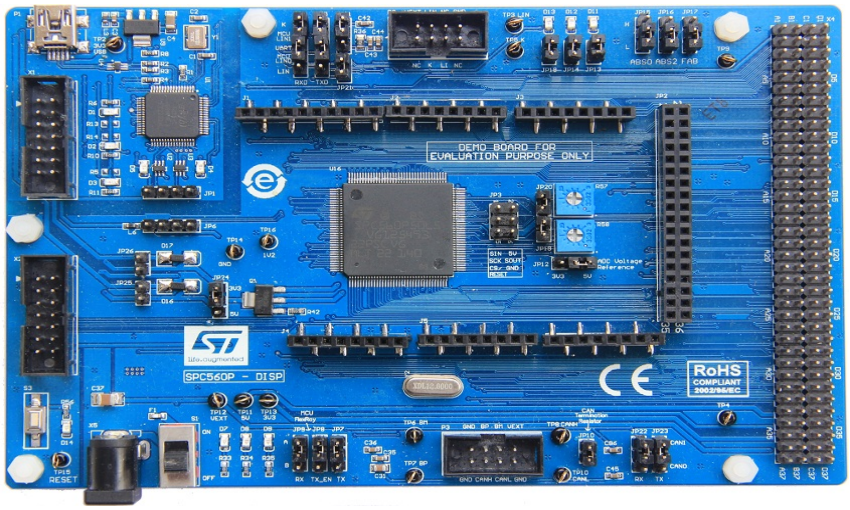
AN4487
Application note

Getting started with SPC560P-DISP

Introduction

The SPC560P-DISP is an evaluation tool supporting STMicroelectronics SPC56P–Line microcontrollers. The selected solution is the quickest way to discover the SPC56P family, to program the device, to build and debug your applications. Dedicated connectors allow plugging shield Arduino-compatible. SPC560P-DISP Discovery+ board is based on the 32-bit microcontrollers Power Architecture® Core SPC560P50L5.

Figure 1. SPC560P-DISP Discovery board with SPC560P50L5



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The SPC560 P line is designed to address cost sensitive chassis, airbag, electrical hydraulic power steering (EHPS), electric power steering (EPS), and electrical motor control applications.

The SPC560P-DISP Discovery+ kit helps to discover SPC560 P line Power Architecture Microcontrollers with full access to CPUs, GPI/O's and peripherals such as CAN, JTAG, K-Line, LIN at budget price.

SPC5Studio is available for download www.st.com/spc5studio.
SPC5Studio comes with HighTec GNU "C" compiler free fully featured 30 days trial version.
An E2E Community is available on ST WEB:
https://my.st.com/public/STe2ecommunities/mcu.

The PCB, all components and all HW parts meet requirements of the applicable RoHS directives.

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1 Getting started

1.1 Delivery checklist

The jumpers allow configuring the board to enable features and different flash modalities. The applied jumper setting allows configuring the board as reported in the schematic diagram.

The external 12 V_{DC} power supply is not provided.

1.2 Setting up hardware and connections

To setup the hardware follow this procedure:

1. Remove the board from the protective plastic envelops.
2. Check the SPC560P-DISP board; the jumpers are already configured. Set the main switch (S1) OFF position
3. Plug the USB cable to the PC
4. The board is now supplied and it is easy to be used and programmed.
5. The LED D8 (+5 V) and D9 (3.3 V) confirm the board is supplied.
6. The demonstration code stored in the board starts[(a)]: the user LEDs D11, D12 and D13 turn on and off alternatively and this proves both the board and the microcontroller work properly.

The jumper configuration can be modified to configure the peripherals or to enable functions. Before modifying the hw configuration or whatever jumper setting, it is mandatory to switch off the board. The configuration will be valid after the board will be switched on.

a. The demo software was loaded during the test board procedure.

2 How to program the board

2.1 How to connect and program/debug the board using an adapter connected to the JTAG connector (X2)

The following procedure describes how to connect and flash the microcontroller using a programmer/debugger connected to JTAG port. It is suggested using an external PSU.

1. Turn off the board (Switch S1=”OFF”).
2. Connect the PSU.
3. Plug the JTAG adapter (14pins female connector - 2 x 7pin) in X2 connector.
4. Turn on the board (Switch S1=”ON”).
5. The board is now ready to be programmed with the user software.

2.2 How to connect and program/debug the board using the integrated programmer/debugger

The following procedure describes how to connect and to program the microcontroller using the USB port and the integrated debugger.

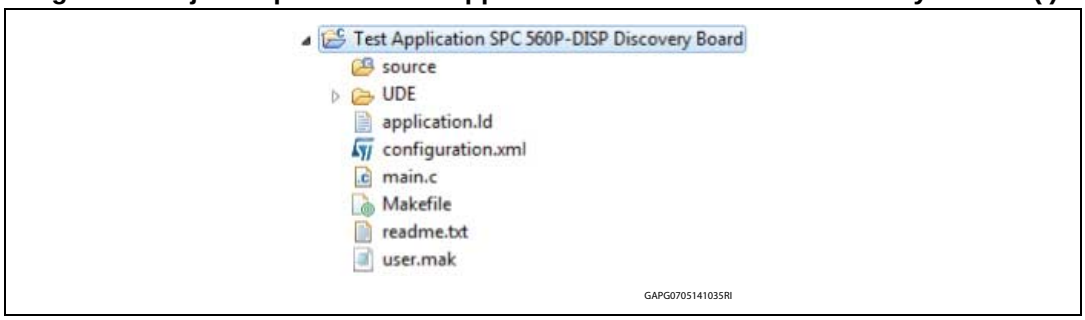
1. Turn off the board (Switch S1=”OFF”)
2. Connect the USB cable to the board
3. Plug the USB cable to the PC (USB 2.0 or higher).
4. The LEDs D8 and D8 are on.
5. The user LEDs D11, D12 and D13 are blinking alternatively
6. The µcontroller is ready to be programmed with the user software.

2.3 Load a test program

The procedure describes how to flash the microcontroller using SPC5Studio and UDE-PLS software.

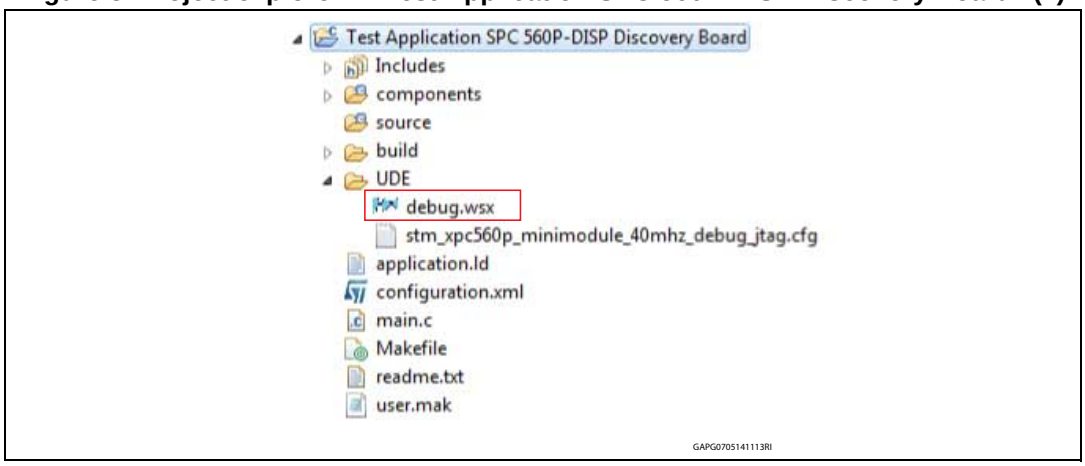
1. Run SPC5Studio.
2. Import the test application developed for this board (“Test Application SPC 560P-DISP Discovery Board.zip”)
3. In “Project Explorer”, select and open the test application project named “Test Application SPC 560P-DISP Discovery Board”.

Figure 2. Project explorer - "Test Application SPC 560P-DISP Discovery Board" (I)



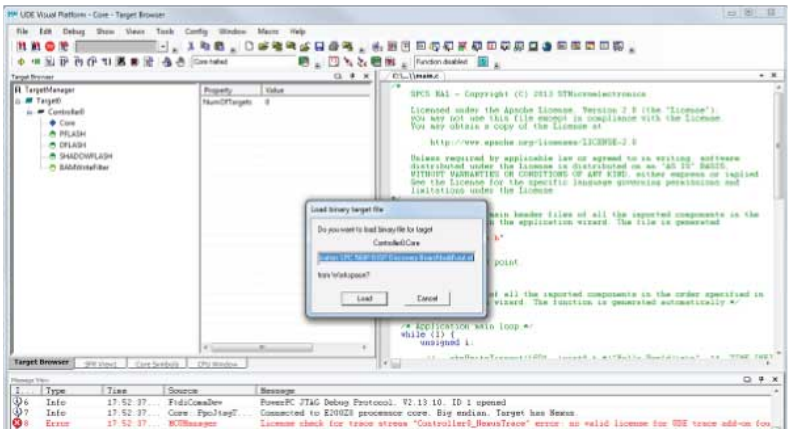
4. The demo code is in the file “main.c”[b]
5. Save, clean, generate and build the project.
6. Select and open the UDE folder then click to "debug.wsx": a new program (UDE Visual Platform) will be launched in a new window.

Figure 3. Project explorer – “Test Application SPC 560P-DISP Discovery Board” (II)



b. The code in this file can be modified by the user

Figure 4. UDE Visual Platform – Window “Load binary target file”



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7. In “Message View” a message informs if the board is connected and if the microcontroller has been identified by the programmer/debugger properly.
8. In the window “Load binary target file” should be present the path where the generated file “out.elf” is stored. The default path is: “C:\SPC5Studio\workspace\Test Application SPC 560P-DISP Discovery Board\build\”. To select a different path or file, press “Cancel” in the main toolbar then select “File” and “Load Program” then select the path and the file to load.
9. Press “Load button” to load the binary “out.elf” file (*Figure 5*).
10. In the new window, press the button “Program All” (*Figure 6*).

Figure 5. UDE Visual Platform - UDE - FLASH/OTP Memory Programming tool

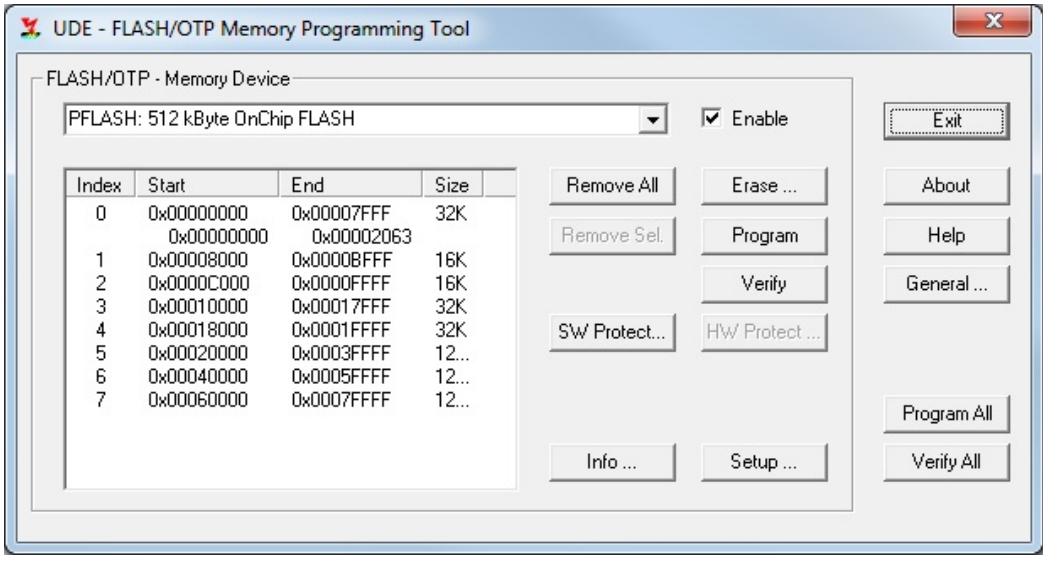

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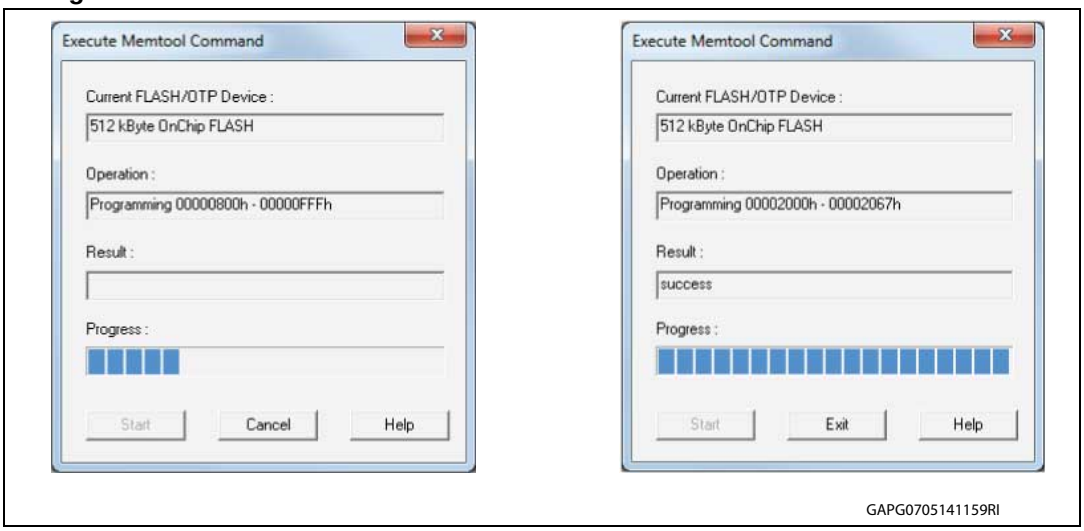
Figure 6. UDE Visual Platform - UDE - FLASH/OTP Execute Memtool Command



11. The microcontroller is now programmed.
12. Close the “UDE Visual Platform”.
13. Turn off the board (disconnect the PSU or remove USB cable).
14. Plug again the USB or plug the PSU and set S1 to ON position
15. Check the user LEDs D11, D12 and D13: they are blinking in according to the code developed and stored in the microcontroller

Appendix A General handling precautions

The following precautions are recommended when using the SPC560D-DIS board:

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

Revision history

Table 1. Document revision history

Date	Revision	Changes
15-May-2014	1	Initial release.