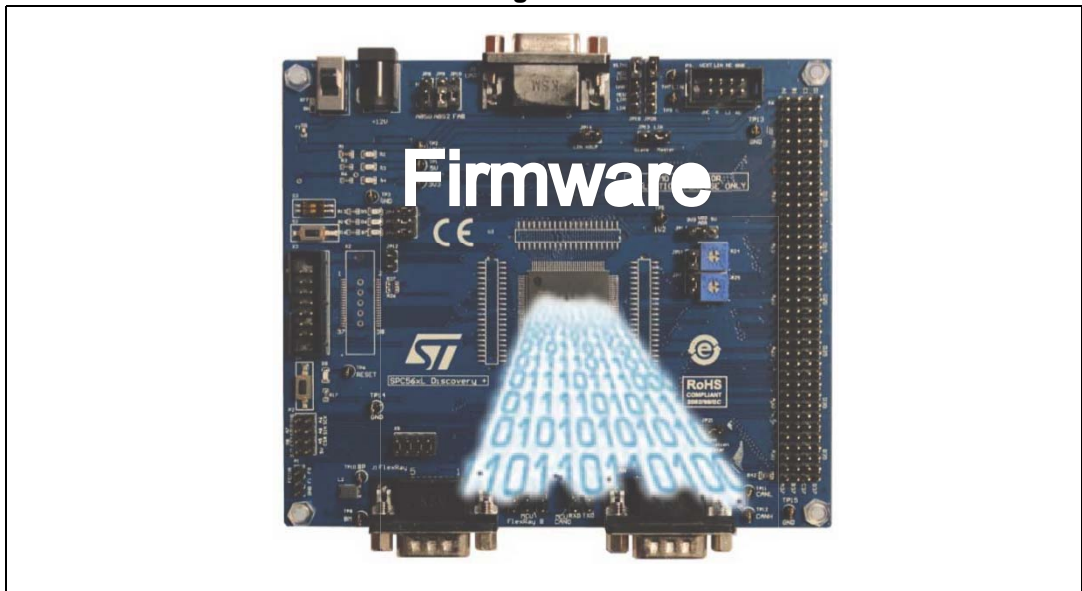## Introduction

This software package includes several firmware examples for SPC56L-Discovery Kit. These ready-to-run examples are provided to help the user to get started quickly with SPC56 L (leopard) line microcontrollers and SCP5L-Discovery hardware. Every example includes source files, the related binary and elf files to program, modify and debug with any environment/tool. It includes as well SPC5Studio project files to easily import, open and modify them using SPC5Studio configurator wizards.

All software examples are mapped on SPC56EL70L5 and SPC56L-Discovery pin configuration but with SPC5Studio they can be easily adapted to any MCU of the same product line and to any target board making discovery kit an ideal evaluation and pre-development platform.

Users are advised to first read the document *AN4321 "Getting started with the SPC56L-Discovery"* and *UM1650 "SPC56L-Discovery user manual"* (see *Section Appendix A: Document references*) to familiarize themselves with SPC56L-Discovery.

These examples are included in the firmware applications package available for download on ST WEB (product code: STSW-SPC56001FW).

Figure 1.

Contents

1 GPIO Toggle OS-Less (pre-loaded in Discovery MCU Flash)

1.1 Purpose

This example shows how to use the GPIO port bit set/reset for I/O LED toggling.

1.2 Description

- In this example:
- SD1 is set to 38400-8-N-1
- "Hello World!\r\n" is output to SD1 serial interface.
- GPIO port A pins 0 and 1 are configured and associated to PA_LED5 and PA_LED6 on the board.
- GPIO port G pins 4 is configured and associated to PG_LED7 on the board.
- In an infinite `while` loop, the PA_LED, PA_LED6 and PG_LED7 are set and reset to create a visible sequence to test the board.
- A delay is inserted between setting and resetting leds on the board to make the sequence as slow as needed

1.3 Usage

- All the source code related to SPC5Studio components is located in./components/<component_name>/[cfg/lib]/[include/src] within the project folder
- To run and debug application you can either:
- Double click on ./UDE/debug.wsx (using PLS debugger)
- Download ./build/out.elf with your favorite debugger
- Makefile and application.ld files are in the root folder of the project

2 PWM-ICU OS-Less

2.1 Purpose

This example shows how to use the SPC5 Studio HAL's PWM and ICU drivers.

2.2 Description

In this example:

- Initializes the PWM driver 1 and ICU driver 1
  – GPIO port D pin 10 is the PWM output
  – GPIO port A pin 0 is the ICU input
- The two pins have to be externally connected together
- Starts the PWM channel 0 using 75% duty cycle.
- Changes the PWM channel 0 to 50% duty cycle.
- Changes the PWM channel 0 to 25% duty cycle.
- Changes PWM period and the PWM channel 0 to 50% duty cycle
- Disables channel 0 and stops the driver

2.3 Usage

- All the source code related to SPC5Studio components is located in./components/<component_name>/[cfg/lib]/[include/src] within the project folder
- To run and debug application you can either:
  – Double click on ./UDE/debug.wsx (using PLS debugger)
  – Download ./build/out.elf with your favorite debugger
- Makefile and application.ld files are in the root folder of the project

3 DSPI OS-Less

3.1 Purpose

- This example shows how to use the SPC5 Studio HAL's DSPI driver.

3.2 Description

In this example:

- Prepare transmit pattern
- Starting driver for test, DSPI_0 I/O pins setup
- Testing sending and receiving at the same time.
- Testing clock pulses without data buffering.
- Testing sending data ignoring incoming data.
- Testing receiving data while sending idle bits (high level).
- Testing stop procedure.
- Application main loop, two SPI configuration are used alternating them.
- PA_LED5 is used to understand when high and low speed configurations are switching.

3.3 Usage

- All the source code related to SPC5Studio components is located in./components/<component_name>/[cfg/lib]/[include/src] within the project folder
- To run and debug application you can either:
  – Double click on ./UDE/debug.wsx (using PLS debugger)
  – Download ./build/out.elf with your favorite debugger
- Makefile and application.ld files are in the root folder of the project

4 GPIO Toggle with ChibiOS-RT

4.1 Purpose

- This example shows how to use the ChibiOS-RT free operating system.

4.2 Description

In this example:

- SD1 is set to 38400-8-N-1.
- Activates the serial driver 1 using the driver default configuration.
- Creates the blinker thread.
- A static WORKING_AREA is reserved for the blinker thread.
- In the Thread1 function, named "blinker", an infinite `while` loop is present, where the PA_LED, PA_LED6 and PG_LED7 are set and reset to create a visible sequence to test the board.
- You can connect a serial terminal to SD1 and communicate with ChibiOS kernel.

4.3 Usage

- All the source code related to SPC5Studio components is located in./components/<component_name>/[cfg/lib]/[include/src] within the project folder
- To run and debug application you can either:
    – Double click on ./UDE/debug.wsx (using PLS debugger)
    – Download ./build/out.elf with your favorite debugger
- Makefile and application.ld files are in the root folder of the project
- Development toolchain
- SPC5Studio (includes Hightec GNU "C" compiler, with a 30-days full free trial license)
- PC5-UDESTK

Appendix A   Document references

- *Getting started with the SPC56L-Discovery* (AN4321, Doc ID 024948)
- *SPC56L-Discovery* (UM1650, Doc ID 024947).

Revision history

Table 1. Document revision history

Date	Revision	Changes
20-Dec-2013	1	Initial release.

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