

M3H Group(1)
Application Note
Input and Output Port
(PORT-M3H(1))

Outlines

This application note is a reference material for developing products using the I/O port (PORT) function of M3H Group(1).

This document helps the user check operation of the product and develop its program

Target sample program: GPIO_LED

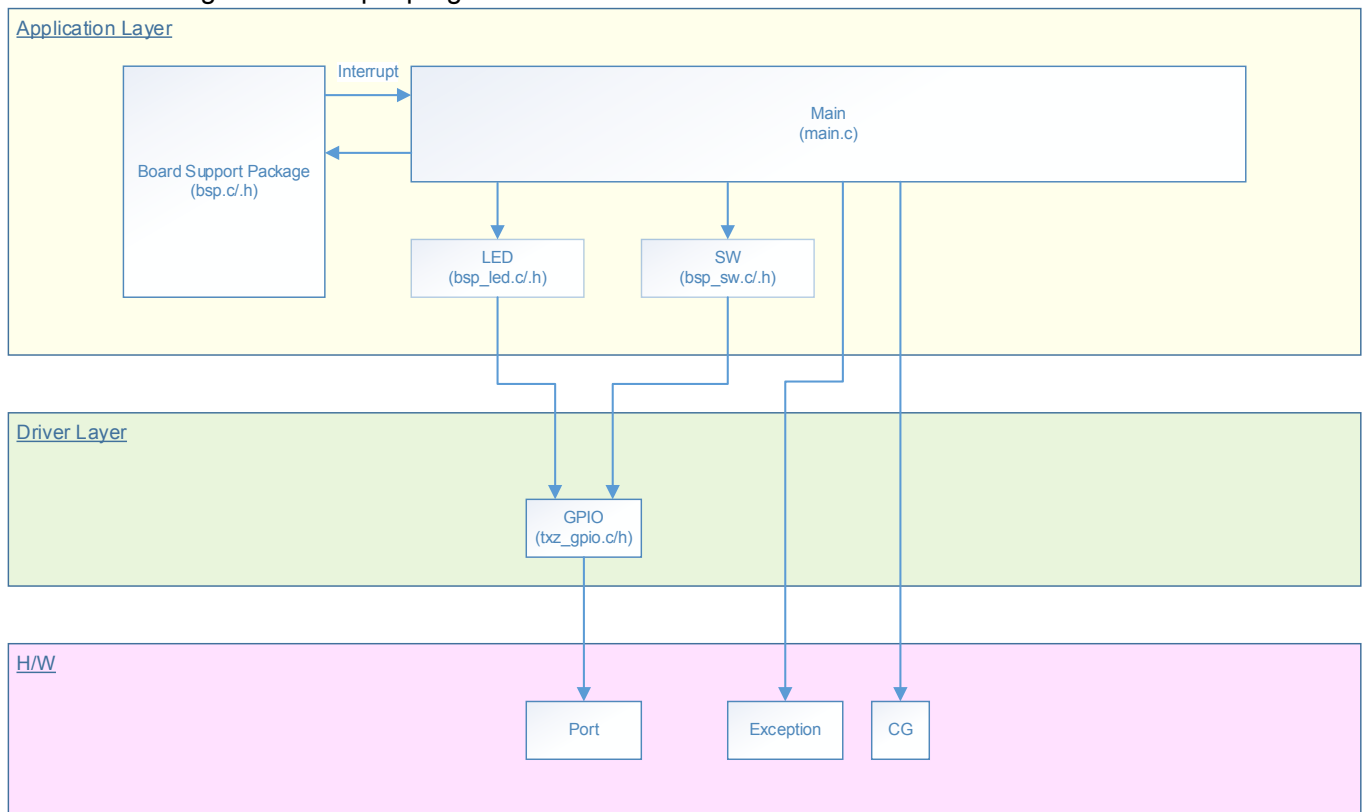
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1. Preface

This sample program uses the Port to light the LED.
LED on and off can be switched by Push switch.

Structure diagram of Sample program



2. Reference Document

- Datasheet
TMPM3H group (1) datasheet Rev2.0 (Japanese edition)
- Reference manual
Input/output ports (PORT-M3H(1)) Rev1.2 (Japanese edition)
- Other reference document
TMPM3H(1) Group Peripheral Driver User Manual (Doxygen)

3. Function to Use

IP	Channel	Port	Function/Operation mode
Input and output port	-	PN1 (Input Port) PN2 (Input Port) PN3 (Input Port) PN4 (Input Port)	Input
	-	PB4 (Output Port) PB5 (Output Port) PB6 (Output Port) PB7 (Output Port)	Output

4. Target Device

The target devices of application note are as follows.

TMPM3H6FWFG	TMPM3H6FUFG	TMPM3H6FSFG
TMPM3H6FWDFG	TMPM3H6FUDFG	TMPM3H6FSDFG
TMPM3H5FWFG	TMPM3H5FUFG	TMPM3H5FSFG
TMPM3H5FWDFG	TMPM3H5FUDFG	TMPM3H5FSDFG
TMPM3H4FWUG	TMPM3H4FUUG	TMPM3H4FSUG
TMPM3H4FWFG	TMPM3H4FUFG	TMPM3H4FSFG
TMPM3H3FWUG	TMPM3H3FUUG	TMPM3H3FSUG
TMPM3H2FWDUG	TMPM3H2FUDUG	TMPM3H2FSDUG
TMPM3H2FWQG	TMPM3H2FUQG	TMPM3H2FSQG
TMPM3H1FWUG	TMPM3H1FUUG	TMPM3H1FSUG
TMPM3H1FPUG	TMPM3H0FSDUG	TMPM3H0FMDUG

* This sample program operates on the evaluation board of TMPM3H6FWFG.

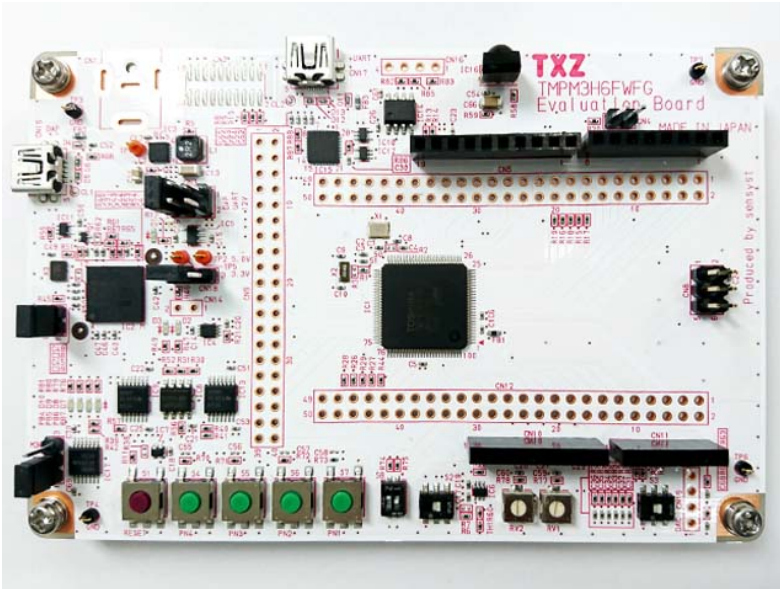
If other function than the TMPM3H6 one is checked, it is necessary that CMSIS Core related files (C startup file and IO header file) should be changed properly.

The BSP related file is dedicated to the evaluation board (TMPM3H6). If other function than the TMPM3H6 one is checked, the BSP related file should be changed properly.

5. Operation confirmation condition

Used microcontroller	TMPM3H6FWFG
Used board	TMPM3H6FWFG Evaluation Board (Product of Sensyset)
Unified development environment	IAR Embedded Workbench for ARM 8.11.2.13606
Unified development environment	µVision MDK Version 5.24.2.0
Sample program	V1100

Evaluation board (TMPM3H6FWFG Evaluation Board) (Top view)



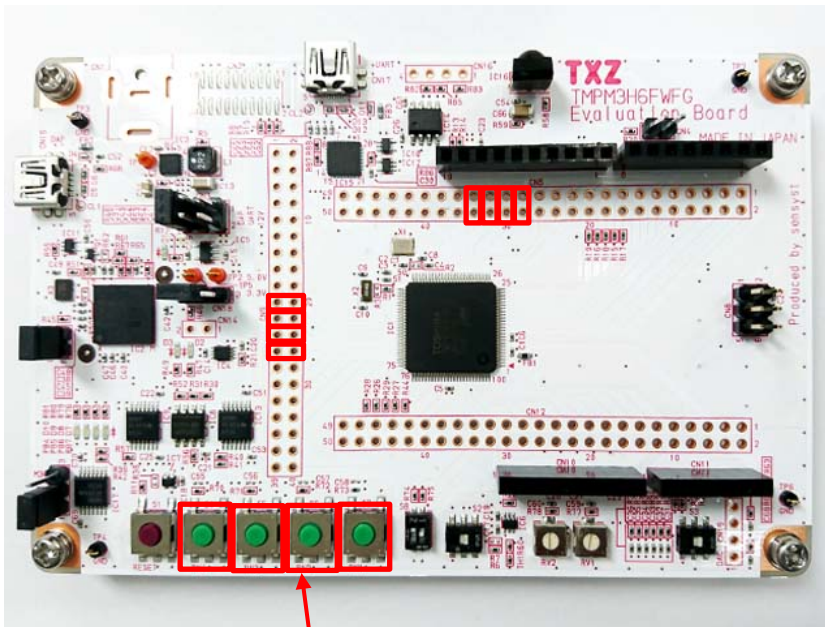
For purchasing the board, refer to the following homepage. (<http://www.chip1stop.com/>)

6. Evaluation Board Setting

The following pin connections should be done on the evaluation board.

CN5		
Use	Through-hole No.	Setting
LED (D10)	27-28	Connection
LED (D9)	29-30	Connection
LED (D8)	31-32	Connection
LED (D7)	33-34	Connection

CN9		
Use	Through-hole No.	Setting
Push SW (S4)	19-20	Connection
Push SW (S5)	21-22,	Connection
Push SW (S6)	23-24	Connection
Push SW (S7)	25-26	Connection



Switches for LED lighting control

7. Operation of Evaluation Board

Push switch changes the LED lighting operation.
While Push switch is pushed down, the corresponding LED on.

While Push switch for PortN4 (S4) is pushed down, PortB7 LED on.
When Push switch is not pushed down, the corresponding LED off.
While Push switch for PortN3 (S5) is pushed down, PortB6 LED on.
When Push switch is not pushed down, the corresponding LED off.
While Push switch for PortN2 (S6) is pushed down, PortB5 LED on.
When Push switch is not pushed down, the corresponding LED off.
While Push switch for PortN1 (S7) is pushed down, PortB4 LED on.
When Push switch is not pushed down, the corresponding LED off.

8. Outline of Input and Output Port function

TMPM3H group has ports, PORTA to PORTR. Each port is used as an input and output pin for a built-in peripheral function as well as it has its own port function.

Since the number of PORT correspondence differs depending on the product, please refer to the product datasheet for details.

9. Sample Program

Push switch are used to light the corresponding LED's.
When a Push switch is pushed down, the corresponding LED on.
When a Push switch is not pushed down, the corresponding LED off.

9.1. Initialization

The following initialization is done after power is supplied.
The port setting is executed after the initialization of each clock setting.
The main operation of the sample program is executed after every initialization completes.

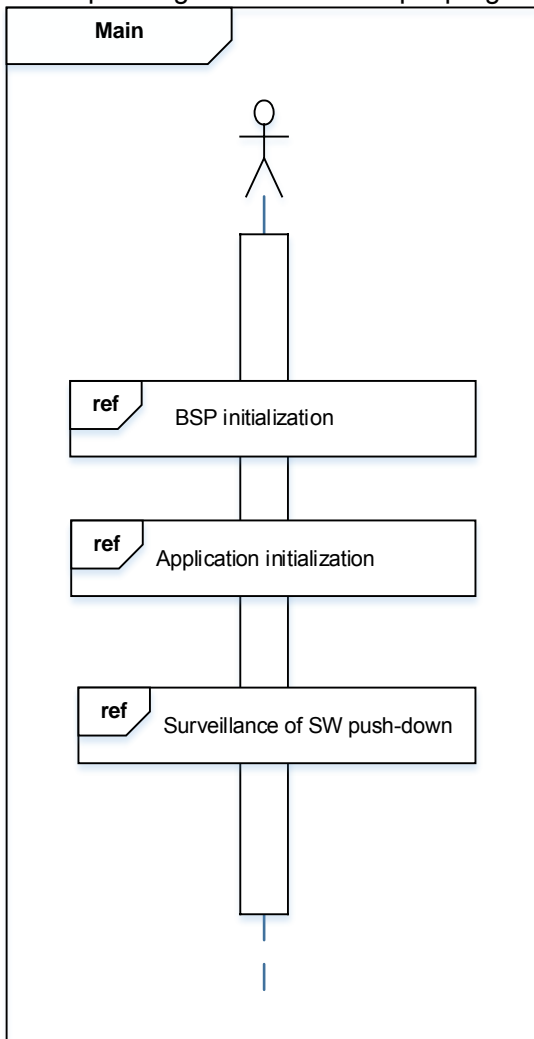
9.2. Sample program main operation

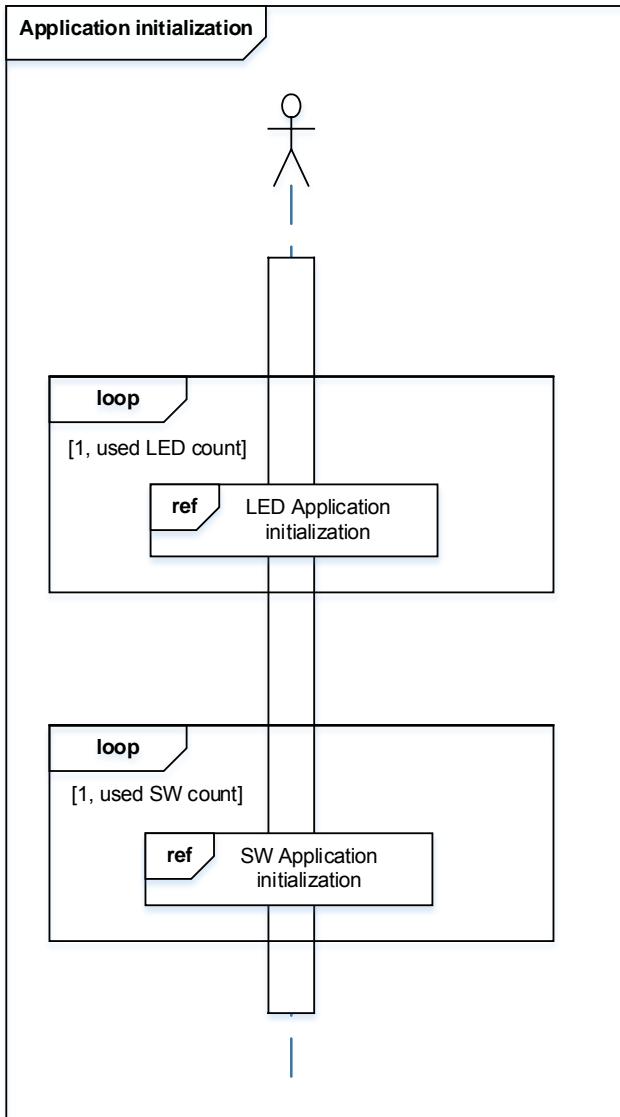
This sample program executes the LED setting after the initialization completes.
The LED setting is four PORT settings from PB 4 to PB 7.
Push switch setting is done after the LED setting.
The Push SW settings are four PORT settings from PN 1 to PN 4.

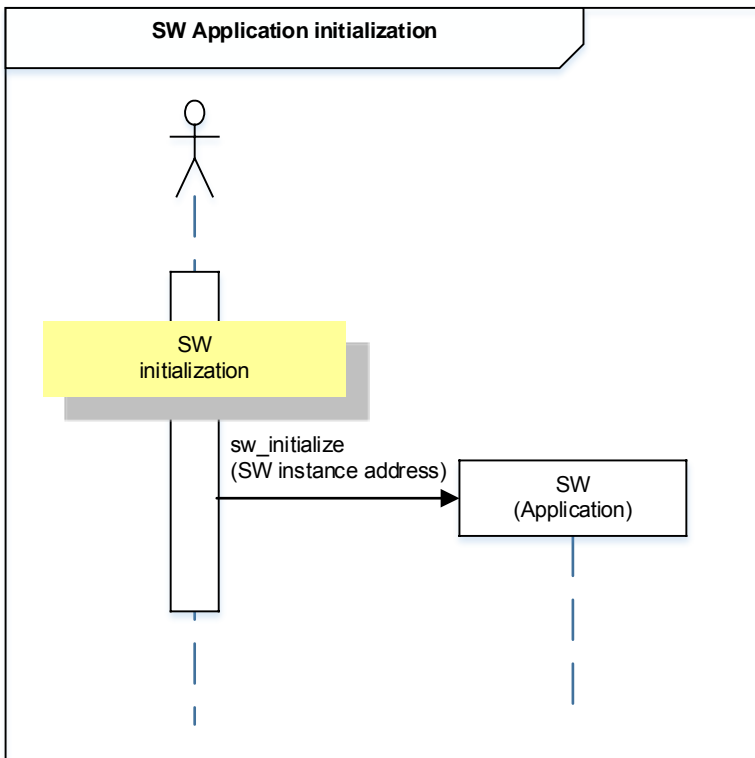
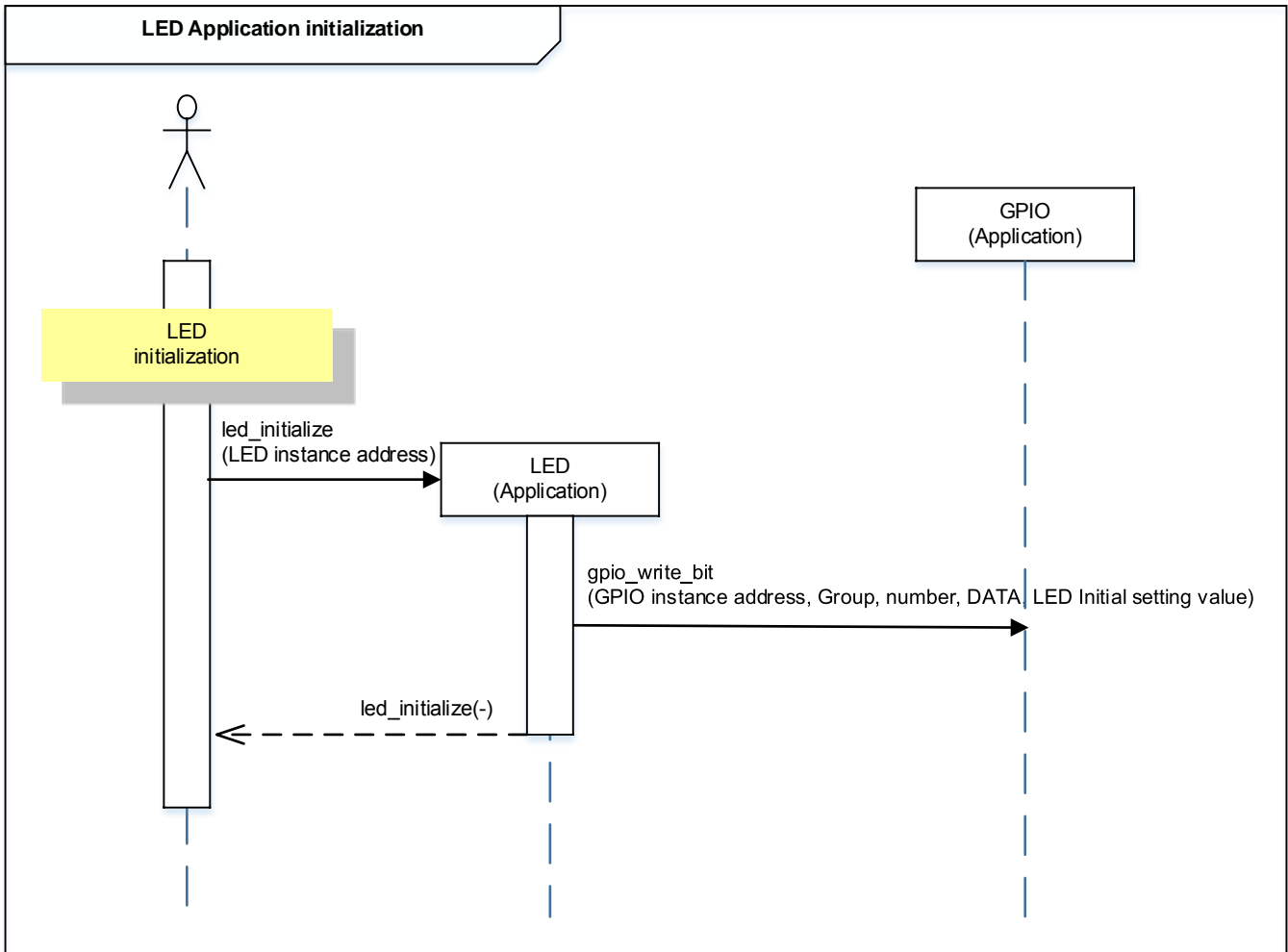
After every setting completes, the main program operates.
The LED control is done by "SysTick" interrupt which checks the status of the Push SW's every 10-ms.

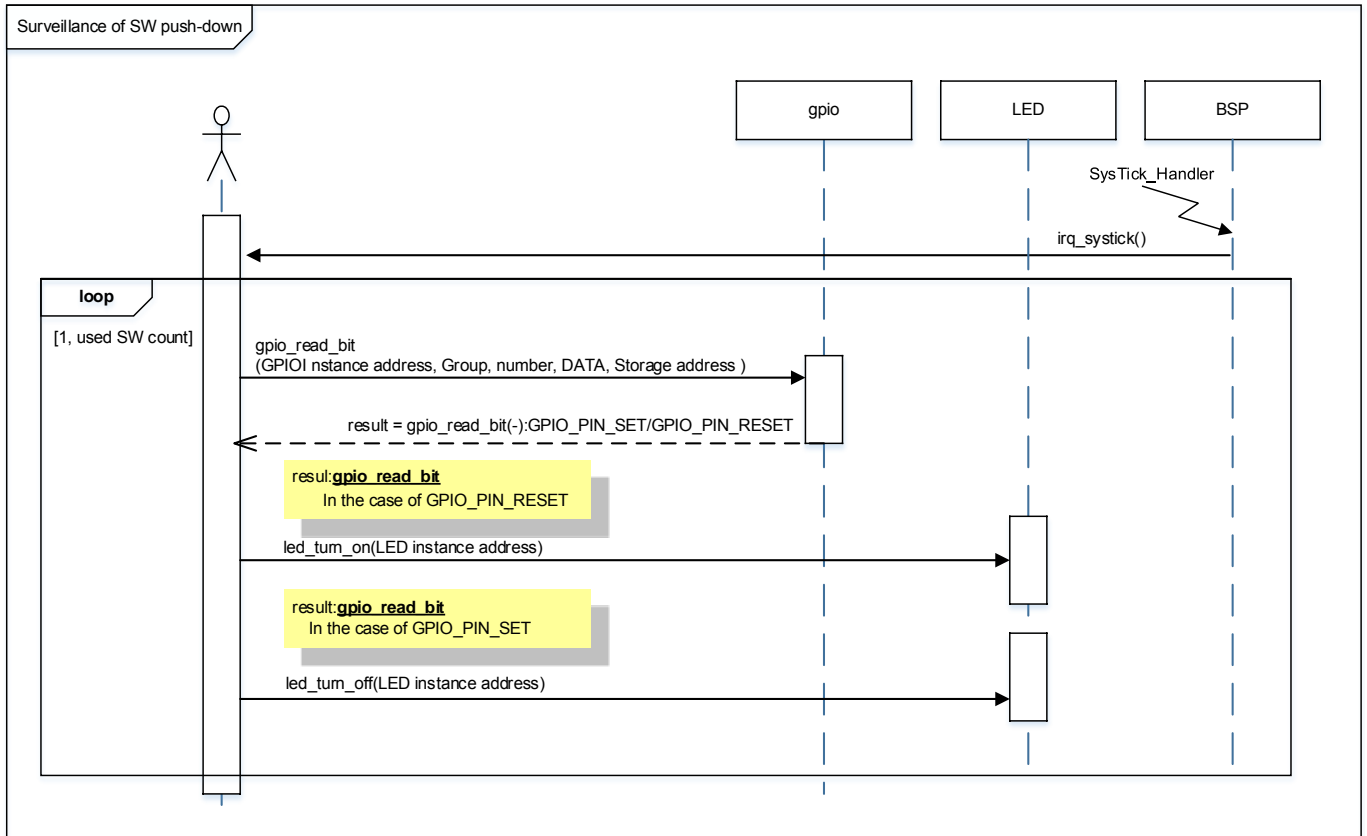
9.3. Operating Flow of Sample Program

The operating flows of the sample program are shown as follows.









10. Precaution

When using the sample program with CPU other than TMPM3H6, please check operation sufficiently.

11. Revision History

Rev	Date	Page	Description
1.0	2018-03-05	-	First release

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