Application Note

FLASH_Code
(FLASH10MUD32-A)

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1. Preface

This application note describes sample software for the Code Flash area rewriting function using the flash driver.
This document helps the user check operation of a product under development and develop its program.

2. Technical Term

Term/Abbreviation	Definition
BSP	Board Support Package
CG	Clock Control and Operation Mode
FLASH	Flash Memory
Timer	T32A:32-bit Timer Event Counter
UART	Universal Asynchronous Receiver Transmitter

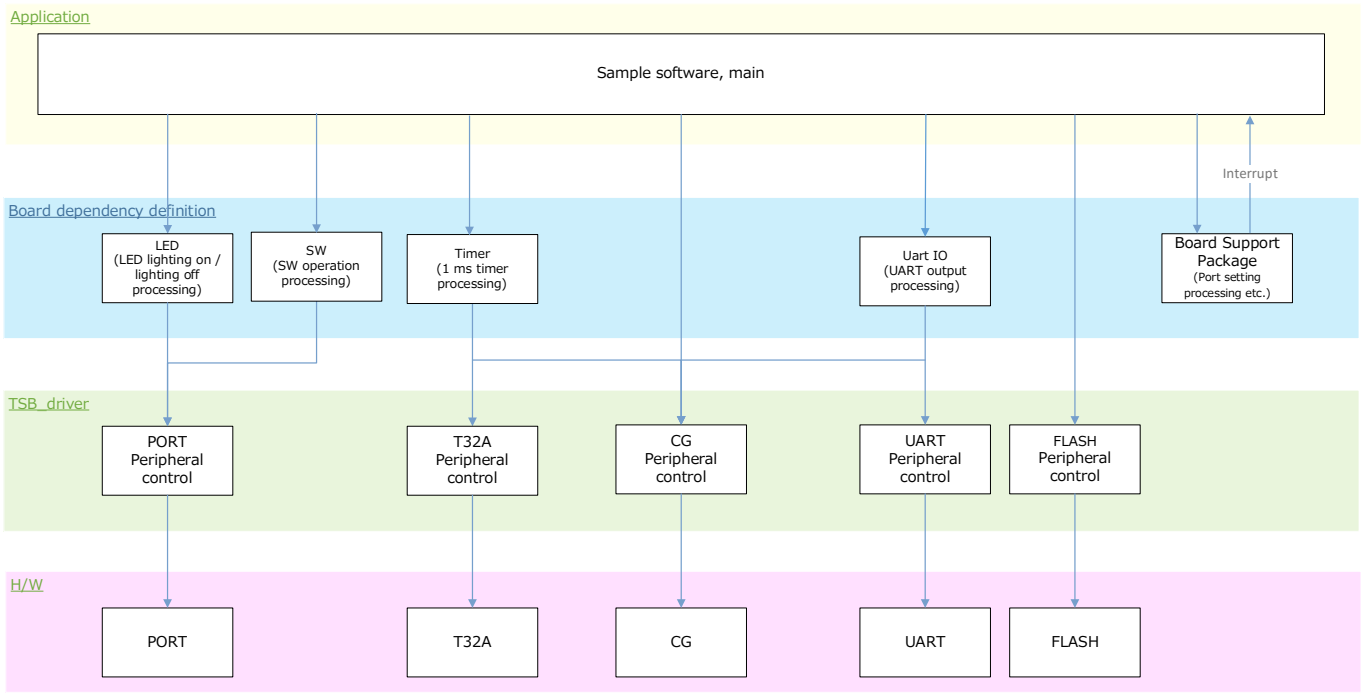
3. Reference Document

Document	Notes
Data sheet	Refer to the data sheet of MCU to be used.
Reference manual	Refer to the reference manual of each IP to be used.
Application note MCU User Guide	Refer to the MCU user guide to be used.

4. Target Sample Program

Sample Program	Outline
FLASH_Code	Sample program of FLASH_Code function

5. Configuration Diagram



6. Sample Program:FLASH_Code

This is sample software that swaps CODE_area_A and CODE_area_B each time BSP_PSW_1 is pressed and executes CODE_area_A.

6.1. Outlines of Operation

Execute the processing of CODE area A.

(1) When BSP_PSW_1 is pressed, BSP_LED_1 and BSP_LED_3 blink at a 1 second cycle, and BSP_LED_2 and BSP_LED_4 will turn off.
(2) Save CODE area A to RAM_A and CODE area B to RAM_B, and erase the data in the CODE area.
(3) Write the contents of RAM_B to CODE area A and the contents of RAM_A to CODE area B.
(4) The processing of CODE area B is executed, turn off BSP_LED_1 and BSP_LED_3, and blinking BSP_LED_2 and BSP_LED_4 at a 1-second cycle.

6.2. Function to Use

The functions to use are as follows:
For the Port assignment of each BSP channel, refer to the MCU user guide.

IP	Channel	Objective
PORT(Push-Switch)	BSP_PSW_1	Event trigger
T32A	BSP_T32A_TIMER_1	Interval timer
PORT(LED)	BSP_LED_1	For operation check
	BSP_LED_2	For operation check
	BSP_LED_3	For operation check
	BSP_LED_4	For operation check
UART	BSP_UART _1	For terminal emulator communication (Outputs log)

6.3. Interrupt to Use

Interrupt	Outlines
*1	UART ch0 Receive interrupt for terminal emulator
*2	UART ch0 Transmission interrupt for terminal emulator
*3	UART ch0 Error interrupt for terminal emulator
INTT32A00A	T32A Timer A Timer counter increment every 1ms for switch and display update

*1 For SBK-M4KN/SBK-M4KN10, "INTSC0RX", for AdBun-M3HQF10/AdBun-M3HQA, "INTUART0RX"
*2 For SBK-M4KN/SBK-M4KN10, "INTSC0TX", for AdBun-M3HQF10/AdBun-M3HQA, "INTUART0TX"
*3 For SBK-M4KN/SBK-M4KN10, "INTSC0ERR", for AdBun-M3HQF10/AdBun-M3HQA, "INTUART0ERR"

6.4. Configuration

"main.c" configuration setting.

Configuration	Current Value	Description
CODE_area_A	Code Flash Block1	-
CODE_area_B	Code Flash Block2	-
CODE_area_size	0x1000	Code Flash size used (secured) in CODE_area_A and CODE_area_B processing
RAM_A	-	Backup RAM in CODE_area_A
RAM_B	-	Backup RAM in CODE_area_B
Cycle A	0.5Hz(2000ms)	BSP_LED_1 blinking cycle
Duty A	50%	
Cycle B	0.5Hz(2000ms)	BSP_LED_2 blinking cycle
Duty B	50%	
Cycle C	0.5Hz(2000ms)	BSP_LED_3 blinking cycle
Duty C	50%	
Cycle D	0.5Hz(2000ms)	BSP_LED_4 blinking cycle
Duty D	50%	

6.5. Example of Terminal Emulator Output

6.5.1. Normal Operation

```
Excecute Program A
Please Press the S4

RAM trasferring.
Rewriting.
Finished.
Excecute Program B
Please Press the S4
```

6.5.2. Case of Erasing Error Occurrence

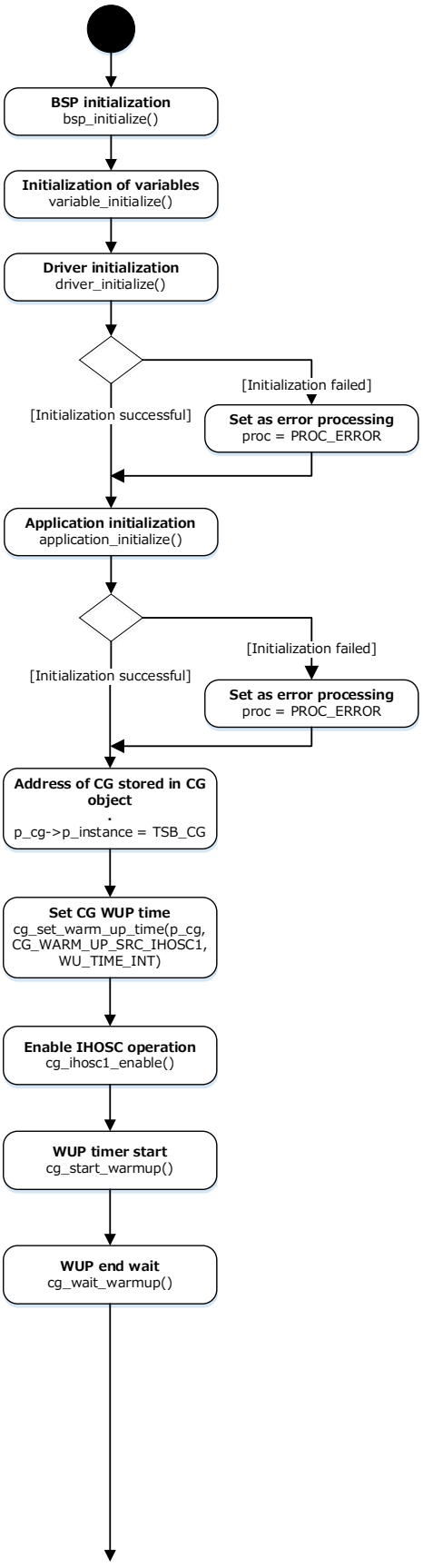
```
Excecute Program A
Please Press the S4

RAM trasferring.
Erasing.
Erasing Error!!
Excecute Program A
Please Press the S4
```

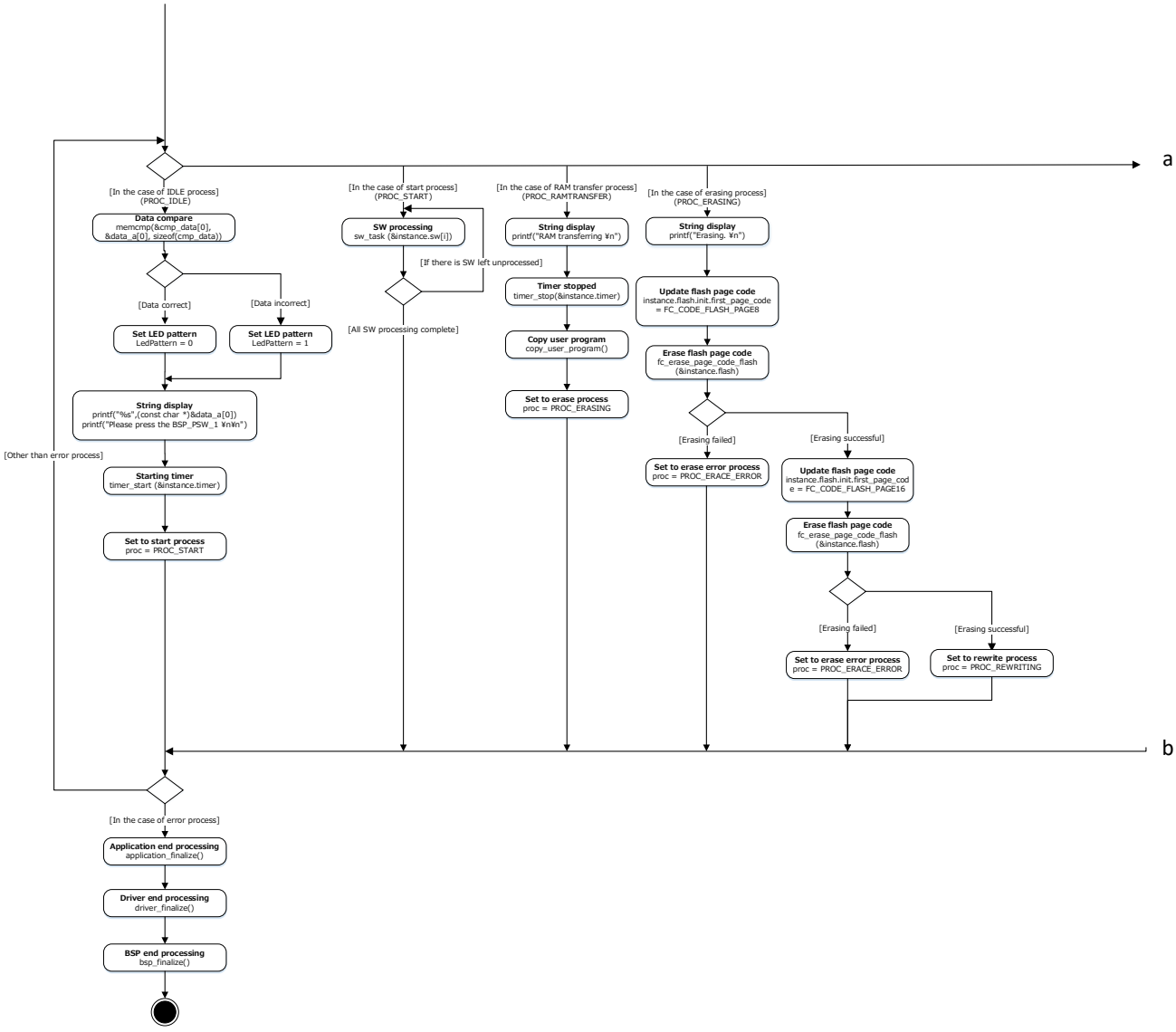
6.5.3. Case of Writing Error Occurrence

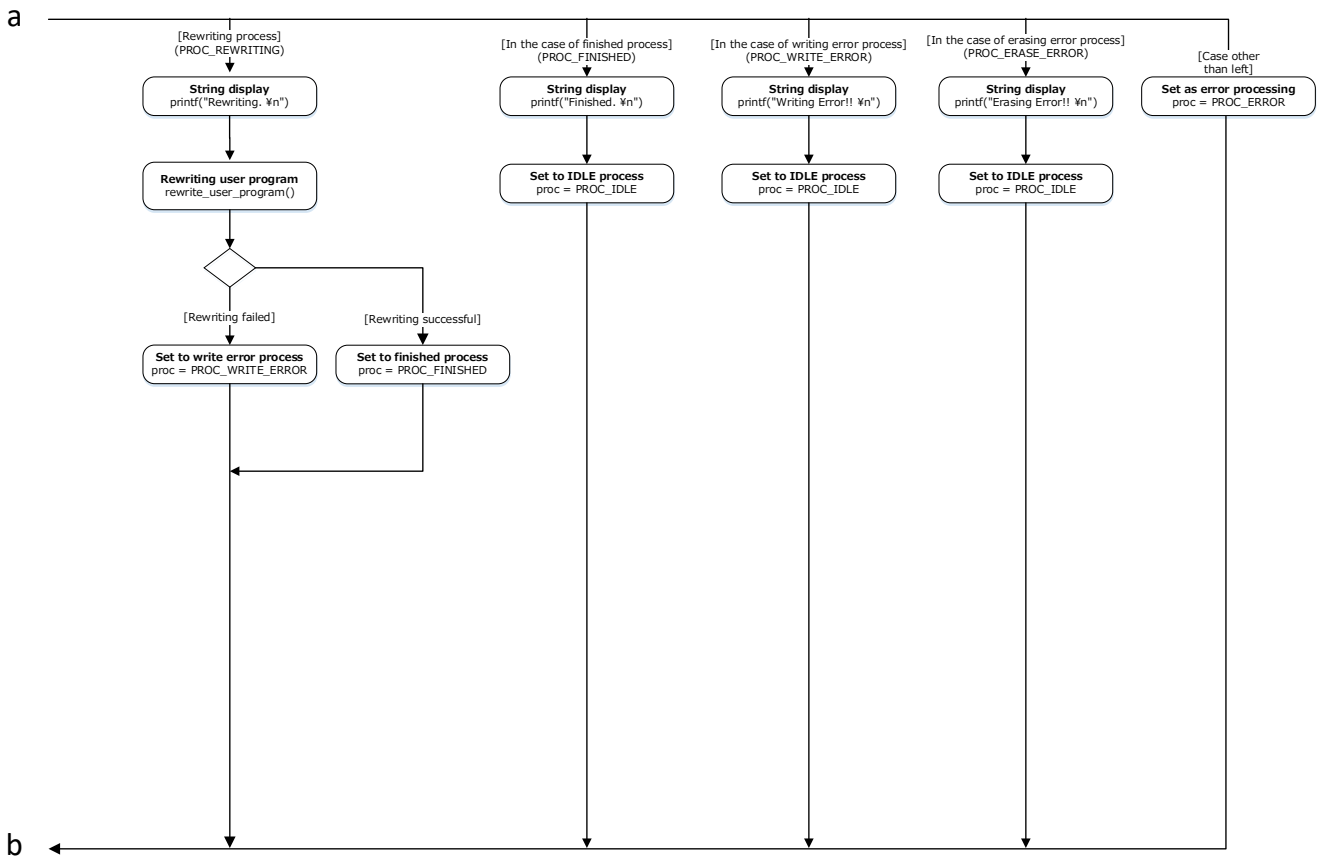
```
Excecute Program A
Please Press the S4

RAM trasferring.
Erasing.
Rewriting
Writing Error!!
Excecute Program A
Please Press the S4
```

7. Activity diagram

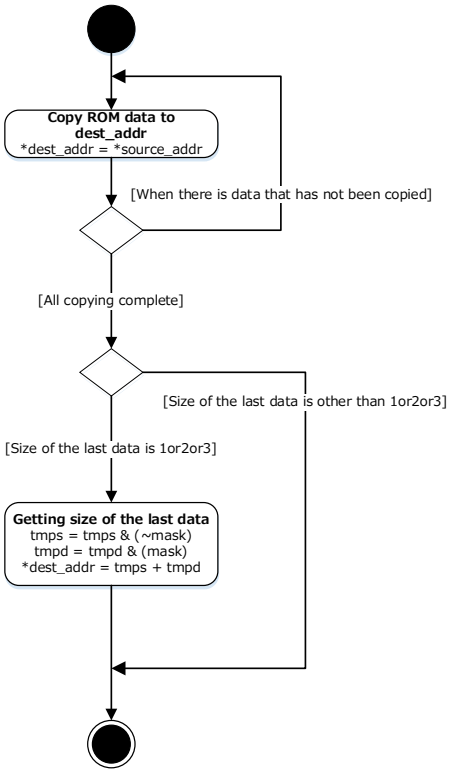
7.1. main



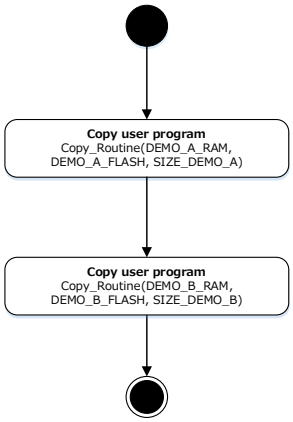




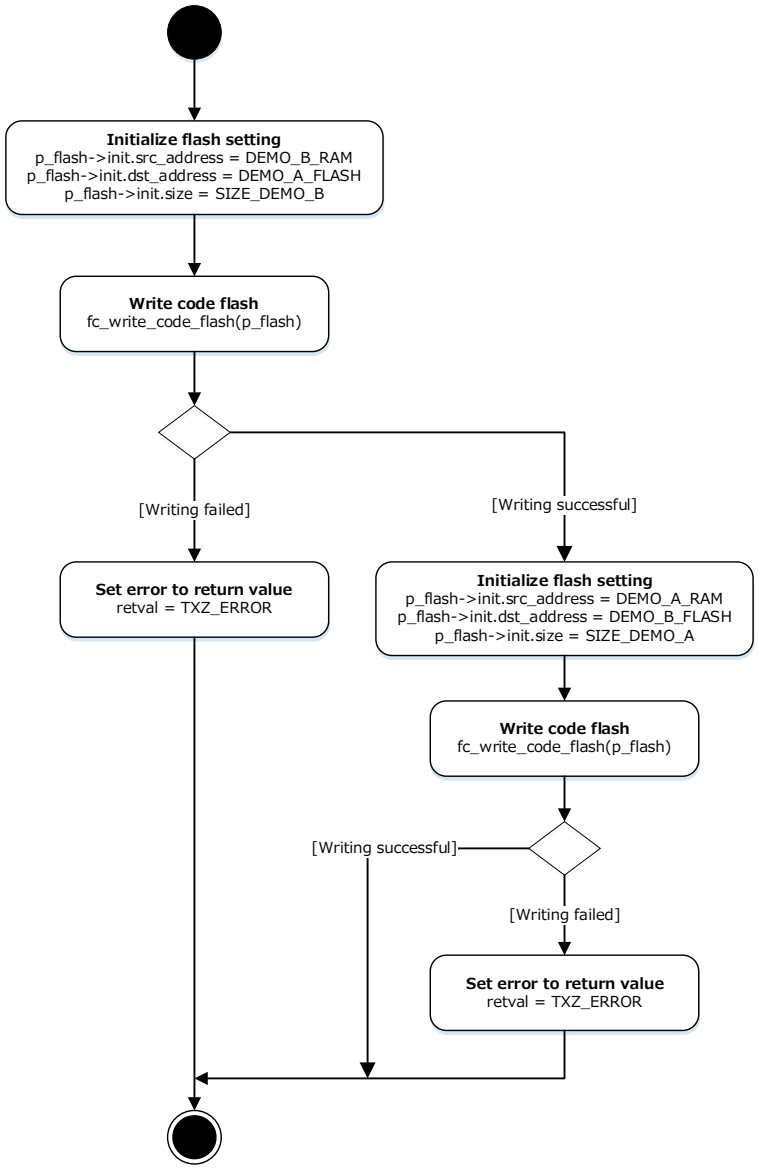
7.2. Copy_Routine



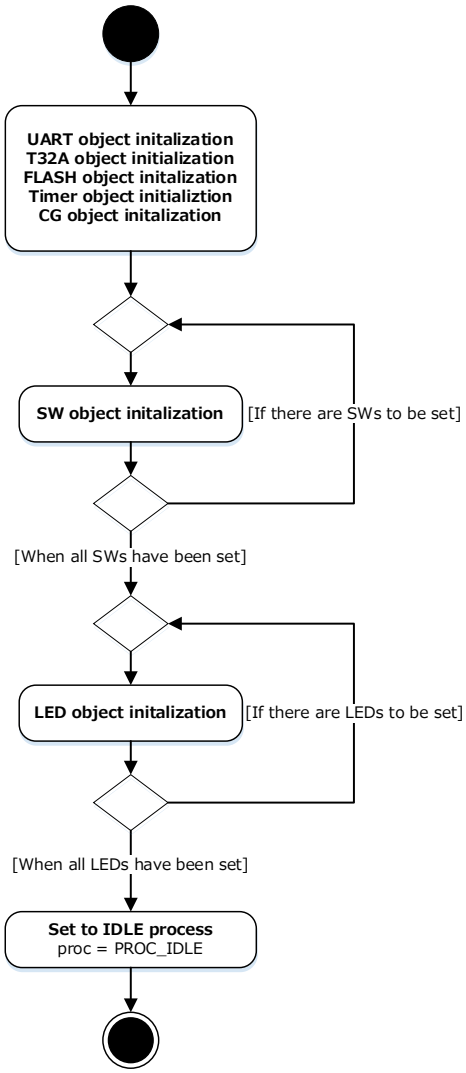
7.3. copy_user_program



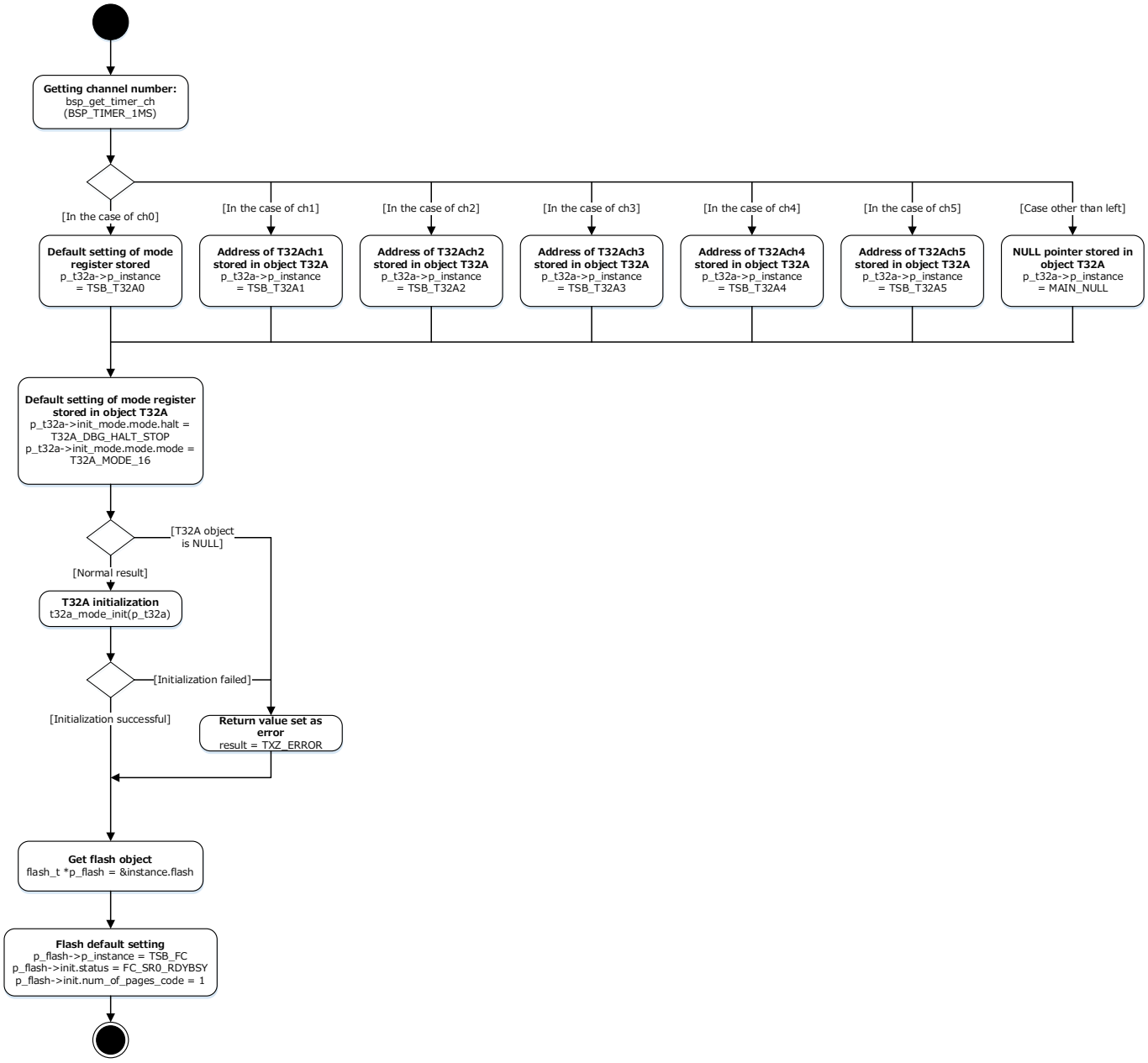
7.4. rewrite_user_program



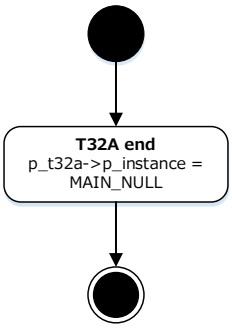
7.5. variable_initalize



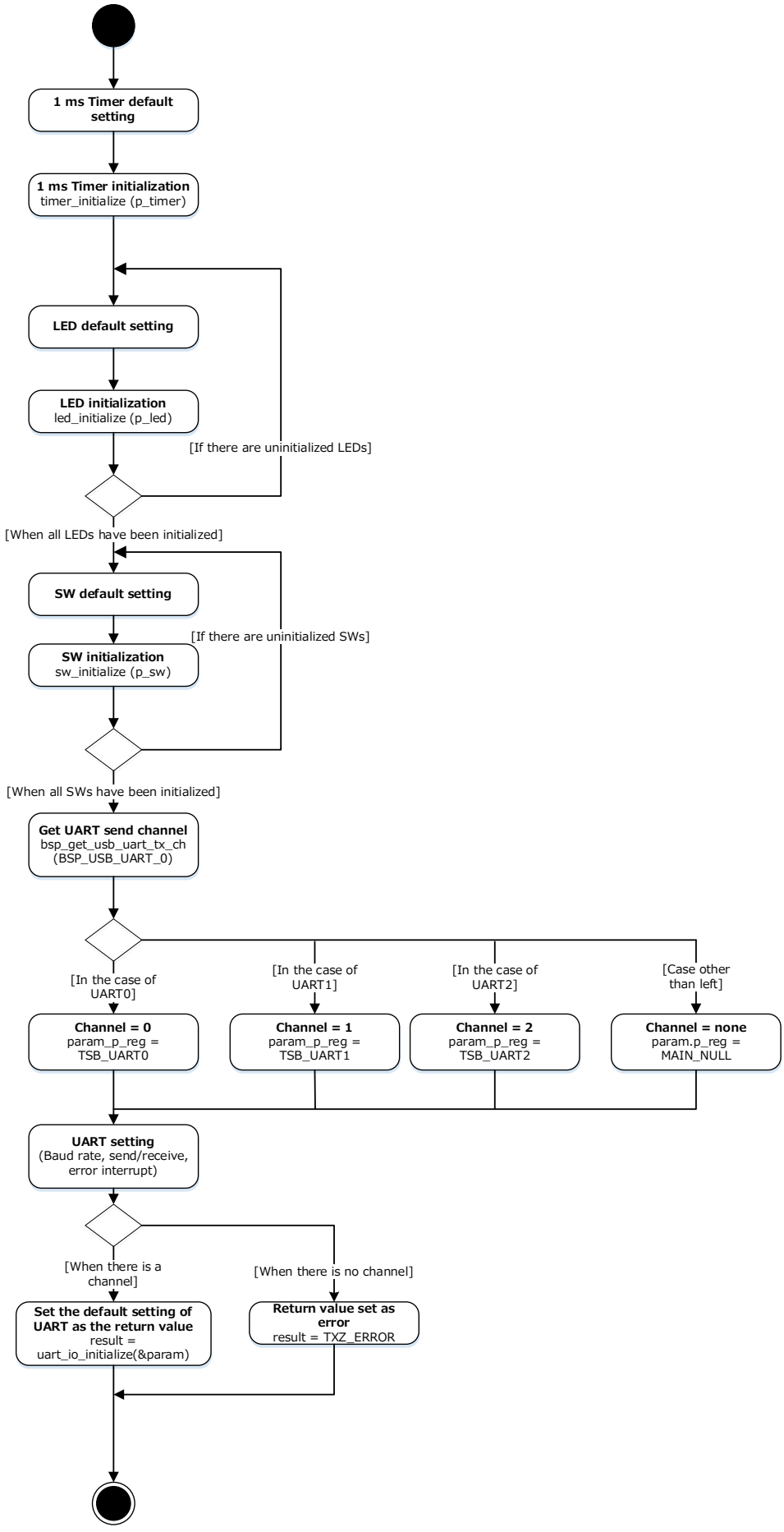
7.6. driver_initialize



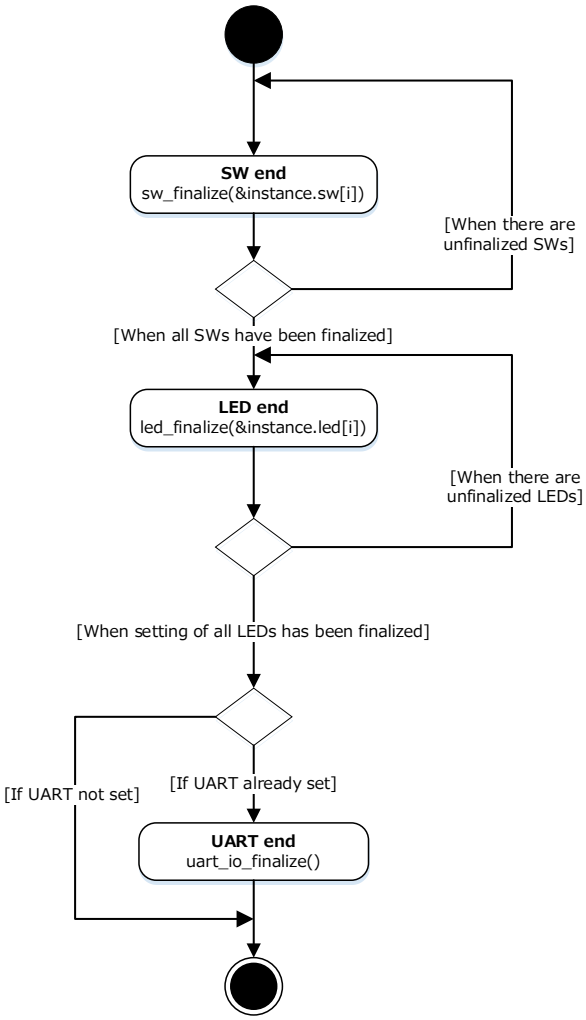
7.7. driver_finalize



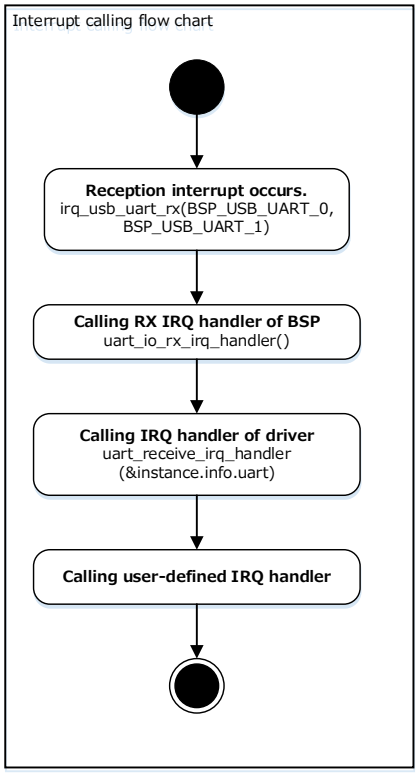
7.8. application_initialize

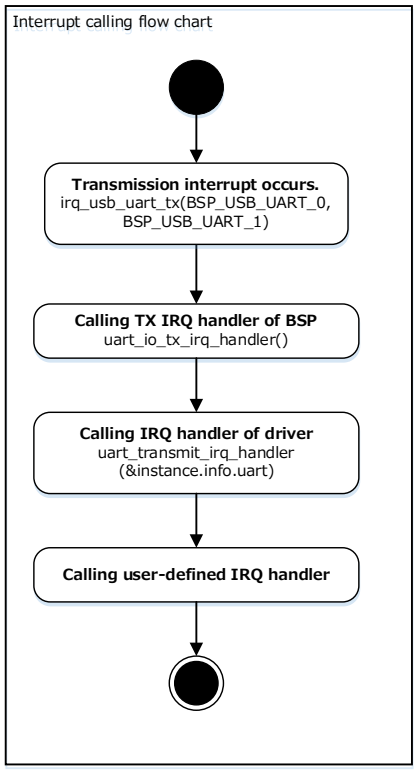


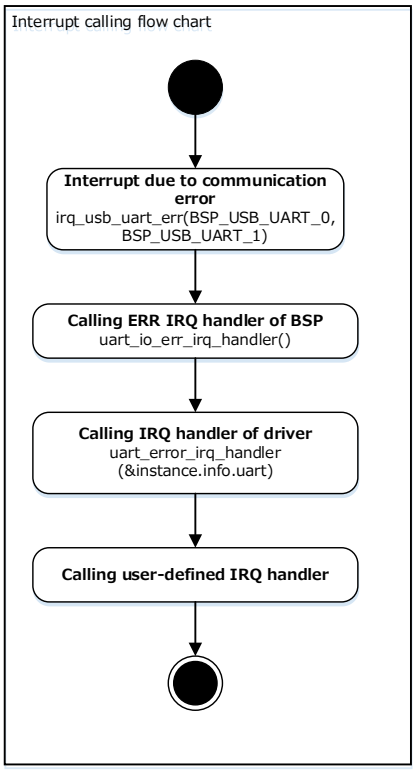
7.9. application_finalize

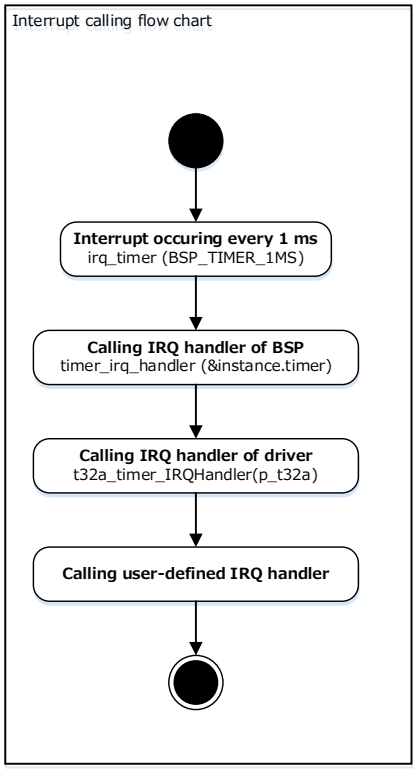


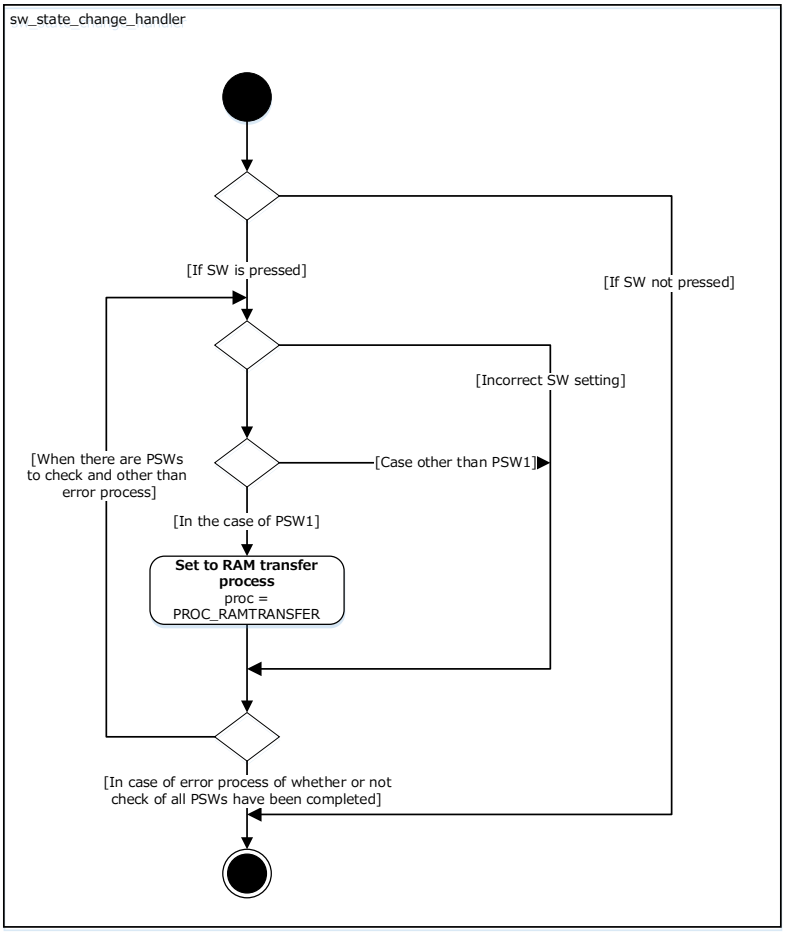
7.10. Interrupt

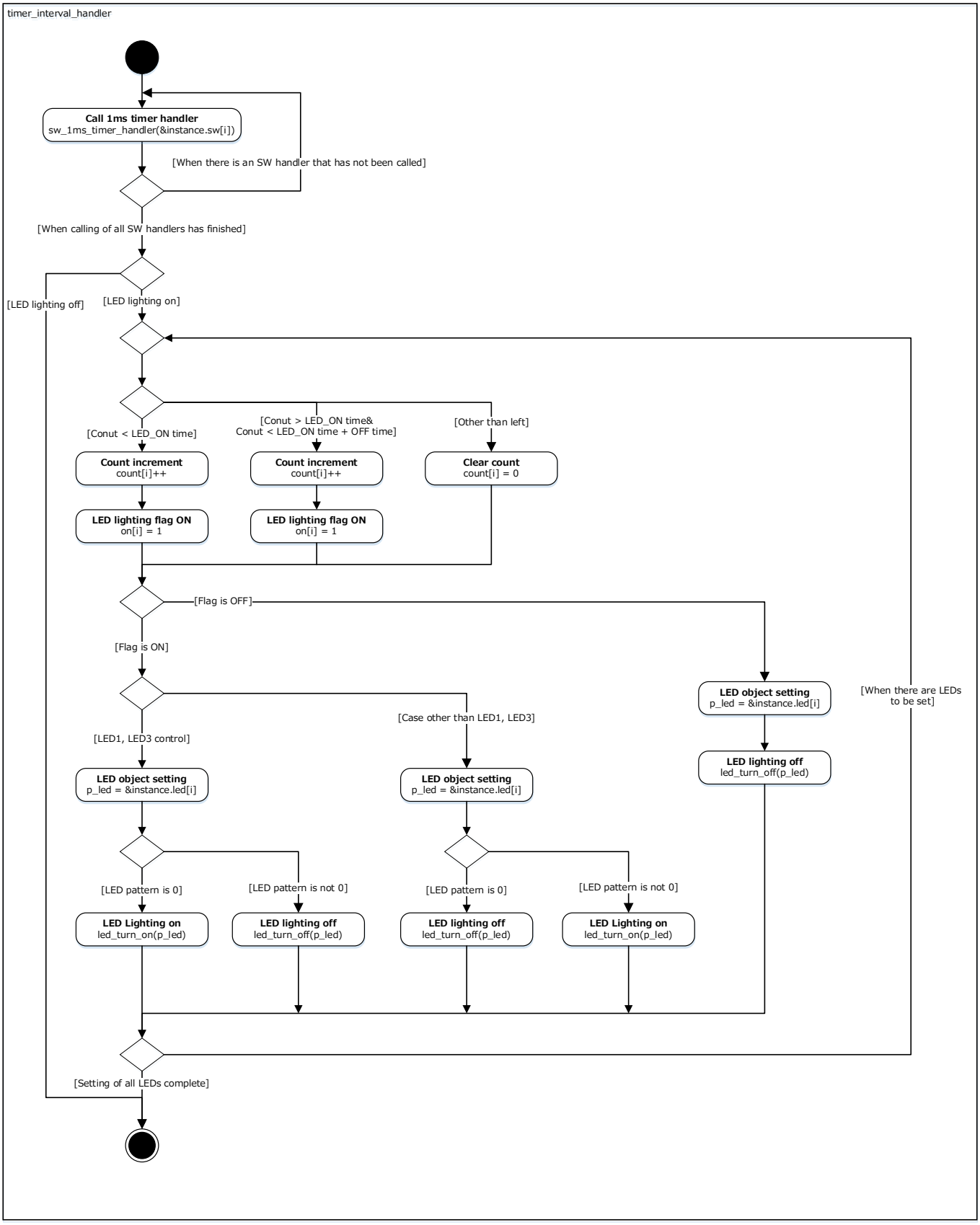












8. Revision History

Revision	Date	Description
1.0	2023-10-16	First release
1.1	2024-07-16	Correction to "6.3 Interrupts to Use" and "7. Activity Diagram main"

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